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COMNAVSURFPAC/SURFLANT INSTRUCTION 3000.15/FLEET MARINE FORCE PAC/ LANT ORDER P3000.15

Subj: STANDARD OPERATING PROCEDURES FOR RAIDING CRAFT

Ref: (a) JCS PUB 3-02
(b) FMFM 8-1
(c) American Practical Navigator (Bowditch), Volume 1
(d) Naval Ships Technical Manual, Chapter 670

1. **Purpose**. To promulgate procedures and guidance for Rigid Raiding Craft (RRC) and Combat Rubber Raiding Craft (CRRC) operations by MEU(SOC) raid companies; to include shipboard procedures, launch and recovery procedures, and operational planning considerations. This SOP is not intended to govern the operations of USN SEAL or USMC Reconnaissance Units. Personnel from these units are specially screened for their swimming skills and are more experienced in amphibious insertion skills.

2. **Background**

a. This SOP was developed jointly by COMNAVSURFPAC/SURFLANT and CG FMFPAC/FMFLANT to outline safe and efficient procedures for the launch, recovery and tactical employment of raiding craft from amphibious ships.

b. The information set forth in this SOP is based on the collective knowledge, experience and lessons learned from Navy and Marine Corps units throughout the Atlantic and Pacific fleets and is published for standardization.

3. **Cancellation**. COMNAVSURFPACINST 3120.11/FMFPACO P3120.36 and COMNAVSURFLANTINST/FMFLANTO P3000.4A.

4. **Scope**. Information, suggestions, and recommended changes to this SOP are solicited from Navy and Marine Corps units. Recommendations from Navy commands should be forwarded to the appropriate Naval Surface Force Commander. Marine units should submit recommendations to their respective Fleet Marine Force Commanding General.

5. **Action**. All units of Naval Surface Forces, Pacific and Atlantic, and Fleet Marine Forces, Pacific and Atlantic, will comply with the guidance set forth in this SOP.

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STANDARD OPERATING PROCEDURES FOR RAIDING CRAFT

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Change Number	Date of Change	Date Entered	Signature of Person Incorporated Change

LOCATOR SHEET

Subj: STANDARD OPERATING PROCEDURES FOR RAIDING CRAFT

Location:

STANDARD OPERATING PROCEDURES FOR RAIDING CRAFT

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CHAPTER 1

COMBAT RUBBER RAIDING CRAFT (CRRC)

COMBAT RUBBER RAIDING CRAFT

100. **INTRODUCTION**. The Zodiac Marine Commando F470 (CRRC) is a squad size inflatable craft designed to facilitate amphibious small boat operations. The f470 is made of neoprene coated tear-resistant nylon cloth. When fully inflated (240 mb or 3.5 psi), the F470 weighs approximately 265 pounds without the engine. The maximum payload is 1230 kg (2710 lbs). The overall length of the craft is 4.70 m or 15'5". The overall width of the craft is 1.90m or 6'3". The F470 will be loaded with no more than eight combat equipped troops, including the coxswain and a-coxswain, with a weight ceiling of 2,000 lbs. This combination allows the craft to perform at its optimum. The presence of crew served weapons, ammunition and other special equipment will be considered as well as the load limitation of 2,000 lbs. F470s used by MEU(SOC) raid companies must be outfitted with aluminum decking to ensure a higher rate of speed, mobility, and maneuverability. The aluminum deck is composed of four light weight, self-locking aluminum sections and two aluminum stringers. The aluminum stringers supplied by the manufacturer are inadequate for moderate-to-heavy surf conditions; locally machined solid aluminum stringers are required. This modification is required prior to CRRC surf operations. CRRCs designated as navigation platforms will have one nautical compass (i.e., Ritchie compass) mounted on the gunnel tube forward of the coxswain and one marine knotmeter (i.e., OMC speedometer) mounted on the transom. This equipment allows the coxswain to maintain course and monitor speed. All F470s should have the following standard accessories:

a. Six paddles

b. Two foot pumps with hoses

c. One collapsed hand bailer

d. One repair kit

e. One pressure gauge

f. Towing and lifting slings (one of each)

g. Two heavy duty 53mm sling bolts, transom mounted

h. (Optional) CO_2 or compressed air self-inflation system

i. Ample lashing line (or 1/2" tubular nylon; amount depends on size of load)

j. Broaching/recovery line (25 feet)

k. One whistle

l. Aluminum deck pieces

m. Solid aluminum stringers

n. Flashlight

Raid companies presently deploy with 18 of these craft, requiring 280 sq. ft. of storage space. CRRCs are stowed on pallets.

101. **PRE-OPERATION CONSIDERATIONS**

a. Outboard Engine Fuel Considerations. Embarking fuel aboard ship presents several problems. LPDs have the facilities to store and pump MOGAS and carry sufficient quantities of MOGAS for CRRC/RRC operations. The use and storage of 18-gallon fuel bladders (or flexcells) will have to be carefully coordinated with the combat cargo officer (CCO), ship's first lieutenant and damage control assistant (DCA); storage, fire, and safety regulations must be considered. Amphibious ships should be outfitted with NAVSEA approved jettisonable racks for the stowage of MOGAS bladders or drums and flexcells in accordance with reference (d).

(1) Use Approved Fuel Bladders

(a) Currently, the only fuel bladders approved for use aboard USN ships are manufactured by NAUTA. The NAUTA U.S. representative is IMTRA Corp. of New Bedford, MA. NAUTA fuel bladders (flexcells) can be identified by the following part numbers: 5211100 (6 gal.), 5211101 (9 gal.), and 5211103 (18 gal.). Any flexcells not having these part numbers will not be used onboard USN ships.

(b) Repairs. Flexcells having fabric repairs will not be used onboard USN ships. Repairs of fittings and gaskets are permissible but require an air pressure test (4 psi) of the repaired bladder prior to placing the flexcell back into use.

(2) Refueling Fuel Bladders

(a) Fuel bladders should be filled prior to embarking aboard ships without MOGAS systems.

(b) Refueling in the well deck is accomplished utilizing MOGAS fueling station located in the 2nd deck starboard catwalk at frame 2-172-1. The existing MOGAS pump takes suction from the gasoline draw-off tank and delivers the gasoline to the MOGAS fueling stations. Adequate hose must be made available so that fueling can be conducted at the after end of the well deck, aft of the water barrier.

(c) Care must be exercised to not over pressure the fuel bladder during refueling. Over pressurizing can cause a weakening of the seams, leading to leaks. More importantly, it can lead to rupturing/gas spills. Fuel bladders should be bled to remove as much air as possible in order to avoid overpressure

caused by expansion of gasses due to temperature fluctuations. It must be noted that the bladder vent only works when it is connected to the engine and air is not permitted to escape while using the fueling hose coupler. Only the standard gravity fuel nozzle (MIL-N-52111 or MIL-N-52110) is authorized for fueling operations.

(d) MOGAS can be dispensed through a 1-inch diameter nozzle gas station trigger type assembly or a Marine Corps flex cell hose assembly connected to the ship's 1.5-inch fuel hose.

(e) After fueling is complete, clean any spillage and restow the fuel hose. Maintain fire precautions and hose team on station until the well deck is certified clear by a gas free engineer.

(f) MOGAS fueling operations should not be conducted concurrent with flight operations.

(3) Defueling Fuel Bladders

(a) If required, defueling of gasoline from fuel bladders can be accomplished by transferring excess fuel into a jettisonable fuel tank bladder. When all fuel has been removed, wash the exterior of the bladder with fresh water and soap. Rinse all fuel contaminated water off of the aft end of the well deck.

(b) When defueling operations are conducted, additional provisions shall be made for stowage and handling of all fuel removed from the boats. Routinely, full fuel bladders and fuel collected in 5-gallon gas cans will be stowed in the jettisonable racks installed for this purpose in accordance with reference (d). If no racks are installed, stowage is authorized in catwalks, on the weather deck, where they can be jettisoned by one person in case of a general emergency. This alternate stowage will be used only contingency operational requirements preclude installation of jettisonable racks. When bladders and 5-gallons cans are carried to the catwalks from the well deck, or back to the well deck for refueling, the transportation is considered a fuel handling evolution. As such, the DCA must be notified, fire party standing by, and the transportation route approved by the DCA.

(4) Ventilation. The existing exhaust ventilation system serving the upper vehicle stowage deck and well deck is adequate in both air quantity removed and duct work arrangement. However, it is not flash arrested nor does it have explosive proof electric motors. During MOGAS fueling and defueling evolutions, a significant amount of gasoline vapors will be present in the fueling/defueling area. Thirty minutes prior to commencement of fueling and defueling evolutions, establish negative ventilation in the upper vehicle stowage deck and well deck.

(5) Warning Plates. Place gasoline hazard warning plates marking the fuel storage and fueling areas in accordance with current directives.

b. Preparation of the CRRC. Prior to any operation, the coxswain is required to ensure that the CRRC is seaworthy and mission ready. The coxswain will designate personnel in his boat team to assist in the preparation of his boat. The mechanics will prepare engines, and work with the coxswains to ensure that all boats are ready and capable of launching at a designated time (see figure 1-1 for pre-ops check list).

c. Flotation Devices. All personnel working on or around the stern gate of a ship or bow ramp of an LCU will wear an approved flotation device (i.e., KAPOK, Panama vest or UDT vest) and an approved protective covering for the head (i.e., safety helmet, Kevlar helmet, steel helmet with liner). At night, personnel working in this area should have a lighted safety light attached to their flotation device.

102. CRRC STERN GATE OPERATIONS

a. Personnel Required. The launching and recovering of CRRCs is a joint Navy/Marine effort that requires specifically assigned personnel who are properly trained in launch and recovery operations.

(1) Navy Personnel			QTY
(a) Well Deck Control Officer (WDCO)			1
(b) Safety Officer			1
(c) Safety Petty Officer			1
(d) Stern gate operator			1
(e) Radio operator			1
(f) Corpsman on scene	1		
(g) Safety craft coxswain	1	---If Navy craft is used as safety boat	
(h) Safety craft assistant coxswain	1		
(i) Safety craft corpsman	1		
(j) Safety swimmer (aboard safety craft)	1	----	
(k) Line handlers	As required		
(2) Marine Personnel			
(a) Launch/recovery officer			1
(b) Launch/recovery NCOIC			1
(c) Ring buoy handler			1

(d) Radio operator at stern gate	1	----If Marine craft is used as safety boat
(e) Safety craft coxswain	1	
(f) Safety craft assistant coxswain	1	
(g) Safety craft corpsman	1	
(h) Safety swimmer (aboard safety craft)/radio operator	1	----

b. Duties and Responsibilities of Key Personnel

(1) Well Deck Control (WDC) Officer. Navy officer, normally ship's first lieutenant. Directly responsible to ship's captain for all operations conducted in the well deck of the ship. Oversees all launch and recovery operations.

(2) Safety Officer. USN officer, observes all launch and recovery operations in order to identify potential accidents/hazards and prevent them.

(3) Safety Petty Officer. USN petty officer assists safety officer in preventing accidents.

(4) USMC Launch/Recovery Officer (L/RO). Responsible to the WDC officer for the following:

(a) The proper execution of launch and recovery of the RRC.

(b) Ensuring L/R team members are thoroughly briefed and understand their duties and responsibilities.

(c) Conducting an inspection of all equipment prior to and upon completion of each operation to ensure serviceability and good working order.

(d) Ensuring the safe movement of CRRCs from well deck to stern gate and from stern gate back to well deck.

(e) Ensuring the launch and recovery is conducted safely.

(f) Proper training of all team members within the launch and recovery team.

(5) USMC Launch and Recovery Noncommissioned Officer-in-Charge (L/R NCOIC). Responsible to the L/R officer for the following:

(a) Knowledge and proper execution of CRRC launch and recovery procedures.

(b) Knowledge and proper execution of all safety requirements related to launch and recovery operations of the CRRC.

(c) Coordination between the L/R team members to ensure a smooth and safe evolution.

c. Launching. There are three recommended methods for launching the CRRC from the LPD, LSD or LST stern gates. The ship should be underway and heading into the seas, and be ballasted so that the bottom of the stern gate is in contact with the surface of the water thus permitting CRRCs to be launched from the stern gate into the water at an angle no greater than 30 degrees. Underway speeds may vary from steerage to greater speeds; sea conditions at the stern gate will dictate speed for launch and recovery. (Historically, 3-5 knots.)

(1) Bow First. The stern gate is lowered horizontal. Up to three craft can be evenly placed on the stern gate of a LPD or LSD; or up to two on an LST. Craft are positioned with their bows aft. All paddles are broken out and distributed. Paddles are placed against the traction bars, ready to push. When the boat teams are ready, the coxswains will signal the stern gate NCO and he will visually verify readiness. The stern gate NCO will notify the well deck control officer that the stern gate is ready to be lowered. As the gate is lowered and the craft begins to float, the boat teams push off and begin to paddle. The number one man sets the pace. Once each CRRC is clear of the ramp area, the assistant coxswain lowers and starts his engine. The coxswains follow 50 to 100 meters behind the ship (in any event outside the ship's wake) in staggered column or line astern formation until all craft are launched.

(2) Stern First. CRRCs are placed on the stern gate so that the transoms are even with the outside edge of the stern gate, and the engine is lowered. The same procedures used in the bow first method are applied in the stern first, except that the boat team back paddles off of the stern gate. With the engine already in the water, it can be started quickly. Stern-first launch allows the coxswain to maintain positive control of CRRC, maintain eye contact with safety personnel, operate engines prior to launch and control the speed of the launch.

(3) Bow First With Sea Anchor. The third method of launching the CRRC from the stern gate is with a sea anchor. When using this method less pushing on the traction bars with paddles is required. It is executed in the same manner as bow first, except that each CRRC will have a RRC sea anchor on a line approximately 30 feet long. After the CRRC(s) is/are placed on the stern gate and all boat team members are positioned in the boat, the number two man will throw out the sea anchor ensuring that it is fully deployed prior to the stern gate being lowered. The stern gate is then lowered and the CRRC is pulled by the sea anchor from the ship. Once the CRRC is clear of the ship, the number two man will retrieve and stow the sea anchor. The assistant coxswain will then lower and start the engine.

d. Recovery. The ship will be ballasted so that the bottom of the stern gate is in contact with the surface of the water thus permitting the CRRCs to be recovered at an angle of 30 degrees or less. The stern gate will then be lowered 30 degrees below horizontal position. Three craft can be recovered at a time aboard LPDs and LSDs; two at a time aboard LSTs. Line handlers from the launching team will be positioned in the well near the sill as the CRRCs approach the stern of the ship. When the "Green Well" is given and the craft are approximately 30 meters away, the coxswain will give the command, "Going in, latch up." Hearing this command, the assistant coxswain will raise the engine latch to the up position. The number one man will raise his inboard hand in preparation to give the "Kill and Pull" engine signal to the coxswain. The number two man will place himself in the bow of the CRRC and prepare to throw the monkey fist on the number one man's signal. When the bow of the CRRC crosses the stern gate, the number one man will drop his hand and sound off, "Kill". Simultaneously, the coxswain will kill the engine, the assistant coxswain will raise the engine to the locked position ensuring the engine remains straight, and the number two man will throw the monkey fist to the line handlers. The line handlers will then take tension on the line and hold the craft against the ramp. The ramp will be raised to the horizontal position when all CRRCs are ready. Once the ramp is horizontal, the coxswain will command "All out". No member of the boat team should exit the boat until ordered to do so.

103. **LCU LAUNCH AND RECOVERY OF CRRC**. The CRRC can be launched/recovered one at a time from an LCU (acting as an intermediate transport vessel) using the bow ramp. The LCU will be stopped with the stern into the sea. Launch and recovery shall not be conducted in sea states above one, or as determined by the LCU craft master. The LCU craft master will conduct a pre-launch/recovery brief for all participating personnel to discuss exercise procedures and safety precautions.

a. Personnel Required. The launching and recovering of CRRCs from LCUs is again a joint Navy/Marine effort that demands specifically assigned personnel properly trained in launch and recovery operations. As this operation is smaller, however, it requires fewer sailors and Marines. The following minimum organization is recommended:

	QTY
(1) Navy Personnel	
(a) LCU craft master	1
(b) Safety petty officer	1
(c) Ramp operator	1
(2) Marine Personnel	
(a) Safety officer	1
(b) L/R NCOIC	1

(c) Line handler 1

(d) Corpsman 1

b. Launching. With launch/recovery personnel on station, one at bow ramp controls (Navy) and one bow ramp NCO (Marine) in the bow ramp vicinity, the bow ramp will be lowered to the horizontal position. The CRRC personnel will carry their CRRC onto the bow ramp placing the stern of the CRRC just past the end of the bow ramp and keeping the CRRC engine clear of the bow ramp and over the water. The CRRC crew will load aboard the CRRC. When the crew is ready to launch, the coxswain will notify the ramp NCO who will visually verify readiness of the craft. The ramp NCO will then notify the bow ramp operator to lower the bow ramp. The ramp is lowered completely into the water with the block resting on the stops to keep the stress off of the bow ramp wires. When the ramp is completely in the water the CRRC crew will first push the CRRC off the bow ramp with their paddles and then back paddle. The coxswain gives all boat team commands. The engine must not be lowered until the CRRC has fully cleared the bow ramp. When the CRRC is clear of the bow ramp, the bow ramp operator will raise the bow ramp back to the horizontal position, and the process is repeated. At no time shall CRRCs be launched or recovered from the stern or over the side of the LCU.

c. Recovery. The LCU will be stopped with stern into the sea. With launch/recovery personnel on station, on e at bow ramp controls (Navy) and one ramp NCO (Marine) in the bow ramp vicinity, the ramp will be lowered to 30 to 45 degrees below the horizontal position. A Marine or Navy line handler will be positioned at the hinge of the bow ramp in the center. Boat teams will break out paddles and place them on the deck, at the ready, in case of engine failure during recovery. When cleared to approach, the coxswain will then raise the engine latch to the up position. The number one man will also raise his inboard hand in preparation to signal the coxswain. The number two man will place himself in the bow of the CRRC, and prepare to throw this monkey fist on the number one man's signal. When the bow of the CRRC is even with the chains of the bow ramp the number one man will drop his hand and sound off, "Kill". Simultaneously, the coxswain will kill the engine by pulling the kill switch, the assistant coxswain will raise the engine to the locked position ensuring the engine remains straight and the number two man will throw the monkey fist in an arching motion to the line handler. The line handler then takes tension on the line and holds the craft against the ramp while it is raised to the horizontal position. The ramp NCO will instruct the ramp operator to raise the ramp and stop when the ramp is in the horizontal position. Once the ramp is horizontal, the coxswain will take charge and command, "all out". He will then instruct his boat team to move the craft off of the ramp, staging it aft on the LCU, and move his boat team back to the ramp to assist with the handling of the next craft. All CRRCs will be recovered in this manner.

104. **NIGHT LAUNCH AND RECOVERY OPERATIONS ABOARD LPDs, LSDs AND LCUs**. Night operations are conducted in the same manner as day operations except that a chemlight can be attached to the monkey fist of each craft so that the line handlers can see the bow line. Additionally, all personnel will have a chemlight attached to their life vest. It is at the commander's discretion to use chemlights as simulated running lights on raiding craft. This decision should be based on the anticipated density of civilian boat traffic. Simulated running lights should not be used during contingency operations, unless for deception purposes. If used, the chemlights are attached to each CRRC (with a minimum of 2-1/8" rubber bands per chemlight) in the following manner: 2 white on outboard engine hood latch, 2 red to grommet located forward 1/3 of port side, and 2 green to grommet located on forward 1/3 of starboard side for a total of 6 chemlight sticks; 3 lighted points.

105. **SAFETY DURING CRRC/RRC LAUNCH AND RECOVERY OPERATIONS** (**NOTE**: For safety during transit, see paragraph 314.)

a. Personnel and Organization. Safety personnel will include, but will not be limited to: one Navy safety officer responsible for safety considerations unique to shipboard operations, the safety petty officer (his assistant), one Marine safety officer responsible for safety considerations unique to CRRC/RRC operations, one ring buoy or Peterson tube handler (Marine), and one corpsman (from ship's crew) with the following equipment: 1-UNIT ONE (emergency medical kit); 1-Miller board; 1-oxygen bottle with resuscitator; 1-blanket, and 1-neck brace. In addition, a coxswain, an assistant coxswain, a safety swimmer with ring buoy or Peterson tube, and a corpsman (from the raid company) with the equipment listed in paragraph 314 will be launched in a safety craft. Both safety officers are directly responsible to the WDC officer, who in turn is responsible to the officer of the deck and ship's captain. The Marine safety officer control Marine crewed safety craft. The Navy safety officer will promote safety/enforce safety regulations throughout the well deck and on the stern gate. He will control Navy safety craft during launching/recovery. Once all craft are launched, Marine crewed safety craft will be controlled by the raid force company commander and Navy crewed safety craft will be controlled by the ship's officer of the deck or captain.

b. Man Overboard Procedures. Immediately upon seeing a crew member or Marine fall overboard, the following man overboard procedures will be conducted:

(1) While Aboard Ship

(a) Sound Alarm. Call out the words "MAN OVERBOARD, STARBOARD SIDE/PORT SIDE"! Ensure the well deck control officer, the officer of the deck and ship's captain are notified.

(b) Mark the Spot

1 Daylight. Throw a life preserver or ring buoy to the victim immediately.

2 Night Time. Throw a lighted life preserver or lighted ring buoy to the victim immediately.

(c) Post a Lookout. Keep the victim in sight. Appoint a lookout. The person who sees the victim fall overboard make the best lookout.

(d) The preferred means of recovery is by safety craft. Raiding craft can be used as a back-up. All raiding craft not specifically assigned to safety craft duties will stay clear. The victim is picked up by the safety craft which maneuvers from its "overwatch" position located 25 to 100 meters astern and to either the port or starboard side of the ship. The craft's safety swimmer swims only as a last resort - emphasis on the life saving principle "Reach, Throw, Row, then GO." The victim is treated by the corpsman on board the safety craft. He then is driven to the stern gate where the safety craft (RRC or CRRC) is either recovered or the victim is transferred across the bow of the craft onto the stern gate. Transferring victims across the bow of a CRRC or RRC onto the stern gate or a moving ship is not recommended. If the safety craft is a LCPL, it is driven to a davit where it and the victim are raised aboard.

(2) While Aboard RRCs and CRRCs (During Transit)

(a) Sound the Alarm. The first man to see the victim fall overboard will call out the words, "MAN OVERBOARD!" The coxswain or his designate will alert the safety boat and other raiding craft in the vicinity using voice, radio, and/or visual signals. At night, flashlight signals have proven best.

(b) Stop the Boat. Unless the craft is in a dangerous surf zone, where stopping would endanger the entire boat team, the coxswain will immediately cut the engine in order to prevent the moving propellers from striking the victim.

(c) Look. The coxswain or his designate will visually locate the victim and keep him in sight until recovered. **NOTE:** At night, ALL personnel will have a lighted chemlight attached to their life vest. This ensure that they will be seen should they fall overboard. This also allows each Marine to tuck the chemlight under his outer clothing upon reaching the BLS. In a wartime mission, the chemlight will be attached, but lighted only on command, or, upon falling overboard.

(d) Reach. If the victim is within reach, a line or paddle will be extended to pull the victim back into the boat. If out of reach, the safety boat should be directed to his location. If the safety boat is unable to respond for any reason, the affected craft can perform the rescue, ensuring that lookouts are

posted to ensure that the boat's props are kept away from the victim. Only as a last resort should a boat team member attempt a swimming rescue. This could easily lead to the need for a double rescue.

106. **FIRE PREVENTION CONSIDERATIONS**. An effective fire safety program is a function of proper stowage, operational smothering system, readily available shipboard fire fighting equipment, frequent training of personnel, and enforcement of fire prevention policies and practice. One of the most important factors that can significantly reduce the possibility of a well deck/upper vehicle space fire is to establish an active program of fire prevention. A localized fire can rapidly engulf the entire upper/lower vehicle stowage/well deck space. Through the implementation and enforcement of the following measures, this danger can be significantly reduced.

a. Immediately isolate, repair and clean up any lube oil, hydraulic fluid, diesel or gasoline leaks.

b. Wipe up any spilled flammable liquids when the spill occurs and dispose of the rags properly.

c. Maintain a fire lane from upper vehicle stowage aft, port to starboard.

d. Ensure that no water reactive flammables are stored in upper and lower vehicle stowage.

e. Assign a 24 hour fire watch to upper vehicle. Upon completion of embarkation, embarked units will provide personnel augmentation to stand fire watches.

f. Ensure all unused accesses are securely dogged to prevent the spread of fire.

g. Develop a "Well Deck/Upper Vehicle/Lower Vehicle Fire Doctrine" and exercise at sea and in port.

PRE-OPERATIONS CHECKLIST FOR THE F470

1. CRRC inflation pressures

   a. Main tubes 3.5 psi _____
   b. Keel tubes 3.2 psi _____

2. Securing engine with 3 points of contact

   a. Starboard and port stern towing eye w/clevice _____
   b. Starboard and port D-rings w/clevice _____
   c. Tilt pin, located underneath the engine with 2 clevices _____

3. Securing fuel bladders with 2 points of contact

   a. Port D-ring w/clevice _____
   b. Starboard D-ring w/clevice _____

4. Boat paddles (6): Secured with a quick release _____

5. Emergency equipment

   a. Emergency repair kit _____
   b. Foot pump w/hose _____
   c. Towing line w/bridle and clevices _____

6. Lashing of weapons and equipment

   a. Tubular nylon secured to deck _____
   b. Packs and equipment snap-linked to the tubular nylon loops _____
   c. Crew-served weapons bags secured and snap-linked to the tubular nylon loops with flotation device inside bag _____
   d. Rifles properly secured in the rifle flotation devices (RFD) _____
   e. RFD snap-linked to the D-rings _____

7. Engines started and tested with purge cup 30 to 45 seconds _____

8. Fuel mixture

   a. 1 pint per 6 gallons _____
   b. 1.5 quarts per 18 gallons _____

9. Engine mounting: Center on transom, secure latches _____

10. Engine operations check

   a. Check propellers _____
   b. Fuel filter _____
   c. Fuel line connector _____
   d. Kill switch w/spare _____

FIGURE 1-1

COMBAT RUBBER RAIDING CRAFT (CRRC) SPECIFICATIONS

OVERALL LENGTH	4.70 METERS	15'5"
OVERALL WIDTH	1.90 METERS	6'3"
INSIDE LENGTH	3.30 METERS	10'10"
INSIDE WIDTH	0.90 METERS	3'
TUBE DIAMETER	0.50 METERS	20"
MAXIMUM # OF PASSENGERS(mfr rec's)	10-MEN	10-MEN
MAXIMUM PAYLOAD	1230 kg	2710 lbs
MAXIMUM HP WITH STD SLATTED FLOOR	40 hp short shaft	40 hp short shaft
MAXIMUM HP WITH OPTIONAL ALUMINUM FLOOR	65 hp short shaft	65 hp short shaft
DIMENSIONS IN BAG	1.5 X 0.75 METERS	59" X 29.5"
WEIGHT WITH STD SLATTED FLOOR	120 kg	265 lbs
WEIGHT WITH OPTIONAL ALUMI-NUM FLOOR	120 kg	265 lbs
NUMBER OF AIR-TIGHT CHAMBERS	5+2+1=8 CHAM-BERS	5+2+1=8 CHAM-BERS
WEIGHT OF CO_2 CHARGED BOTTLE WITH MANIFOLD. U.S. D.O.T. APPROVED	20.45 kg	45 lbs

FIGURE 1-2

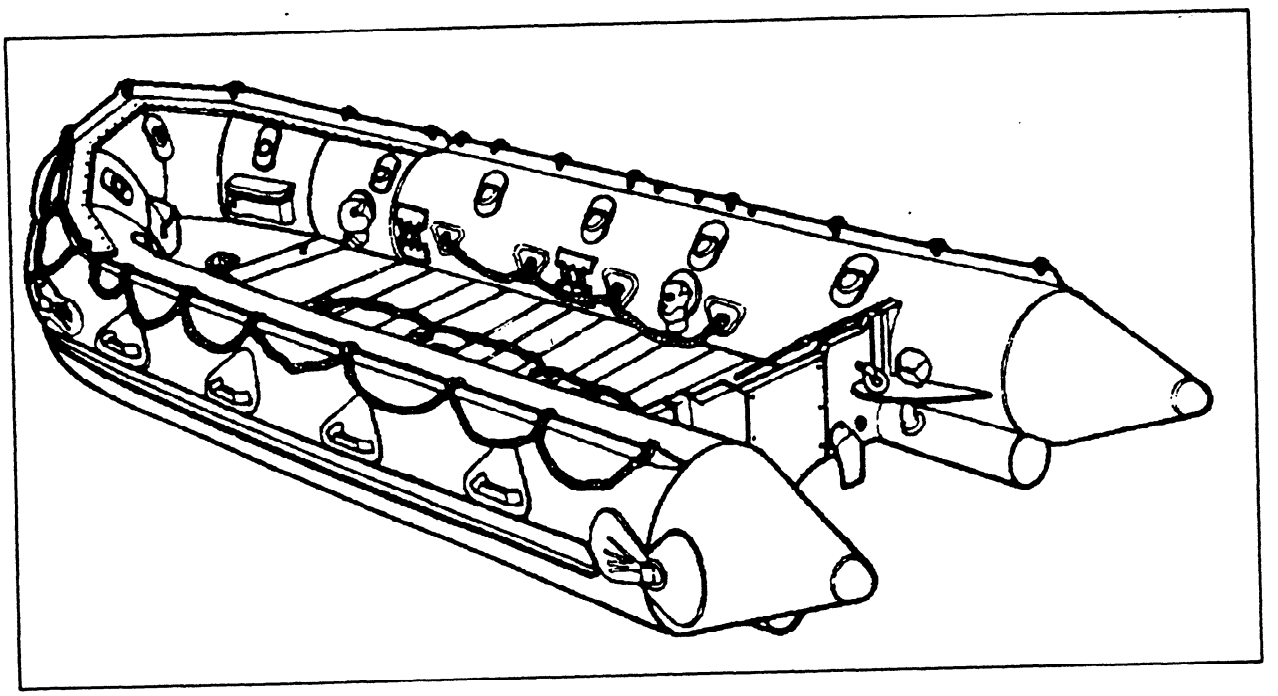
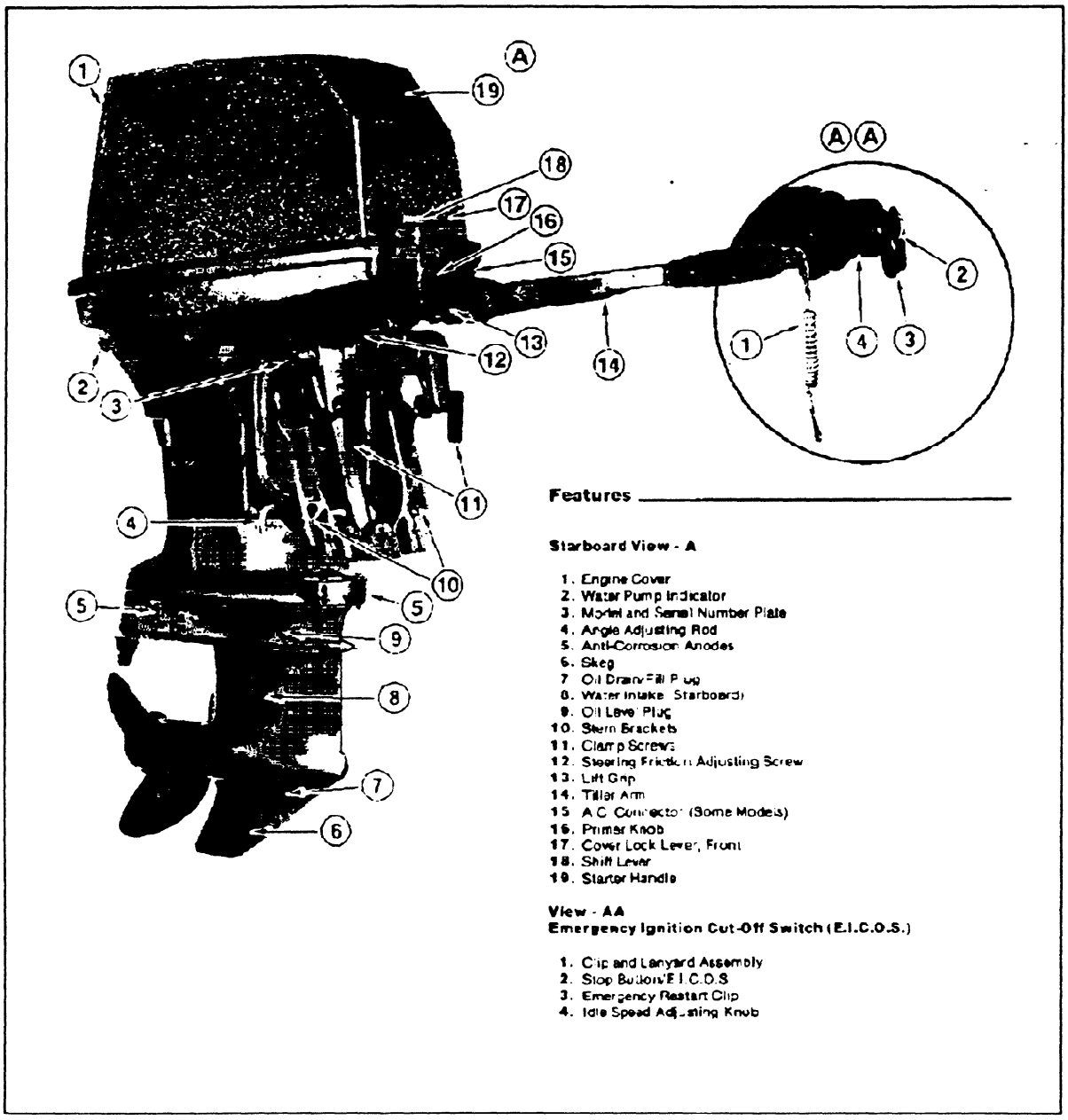


FIGURE 1-3



Powerhead.....2 cylinder-2cycle, alternate firing

Horsepower.....55 at 5000 RPM

Weight.....184 pounds

RIGID RAIDING CRAFT (RRC)

RIGID RAIDING CRAFT (RRC)

200. **INTRODUCTION**. The Boston Whaler Rigid Raider (Rigid Raiding Craft or RRC) is a squad size rigid (Fiberglas) hulled craft designed to facilitate amphibious small boat operations. RRCs are now being employed with Marine Expeditionary Units (Special Operations capable) (MEU(SOC) aboard Amphibious Readiness Group (ARG) ships. A general description of this craft is found in Appendix A, pp A-1 and A-2. Twelve to fifteen RRCs are normally deployed aboard an LPD. This number may be modified based on mission requirements and craft availability. All RRCs have a nautical compass (i.e. Ritchie compass) mounted on the console. RRCs designated as navigation platforms will also have a marine knotmeter (i.e. OMC Speedmeter); the impeller will be mounted on the transom and the read-out will be mounted on the console. This equipment allows the coxswain to maintain course and monitor speed. All RRCs should, in addition, have the following standard accessories:

a. Six paddles

b. Six inflatable rollers

c. Two 1/2" mooring lines, 6 feet in length

d. One 1/2" towing/recovery line, 25 feet in length

e. One 15 lbs. plow anchor with 6 feet of chain link and 120 feet of 1/2" line

f. One black nylon troop strap

g. One fire extinguisher

h. One Marine flare kit

i. One flash light

j. Lashing line or 1/2" tubular nylon (length depends upon size of load to be carried)

k. One aluminum boat hook (gaff type)

l. Four lifting D-rings

m. One whistle

n. As required for night operations; 6 chemlites (with 6 rubber bands at least 1/8" wide for attachment) are required for navigational lighting: 2-white (stern), 2-red (port), and 2-green (starboard). Two chemlites and two bands per light point

o. Four additional pints of 2-cycle engine oil

p. One standard Boston Whaler RRC tool kit

201. **PREPARATION OF THE RRC**. Prior to any operation, the coxswain is required to ensure that the RRC is seaworthy and mission ready. The coxswain will designate personnel in his boat team to assist in the preparation of his boat. The mechanics will prepare engines, and work with the coxswains to ensure that all boats are ready and capable of launching at a designated time (see page A-19 of Appendix A, RRC and Associated Equipment Description, for pre-op check list). Key personnel required for launching and recovery are specified in Appendix B, Detailed Dry Well Launch and Recovery Procedures.

202. **EQUIPMENT FOOT PRINT**. The deck space requirement for RRC, and associated equipment is listed as follows:

Description	Estimated Square Footage	Remarks
12-15 RRC cradles with engine rack	1024	Configured in 3 tiers (128'L by 8'W) for LPD 4 class. Engines attached to RRC cradle starboard side. Configured differently for LPD 1 class (9 RRC only)
1 connex box	56	
QUADCONS	160	Maintenance facility for engine/boat work. (Must be positioned by embarking unit's 10k Terex fork-lift)
1 engine test tank	36	To be located between starboard upper vehicle bulkhead and RRC cradle.
12 boat dollies	32	Stacked on end against the bulkhead in upper vehicle stowage.
2 launch recovery devices (LRDs)	320	Can be stowed on the beach ramp in sections.
Estimated Total	1628 SqFt.	

The estimated total is 1628 square feet. This estimated figure does not take into consideration the griping of equipment and shipboard minimum fire lane requirement (a broken stowage factor of .75 may be applicable) (e.g., 1628 SqFt/.75 = 2171 SqFt)).

203. **RRC STOWAGE CRADLES**. The RRC cradle has a tubular steel frame constructed so that the cradles stack, one on top of the other, up to three cradles high. Ship's single or dual monorail is used to load or unload the RRCs. While deployed aboard ship,

RRC cradles are intended to remain stationary. Therefore, they should be griped to the deck in position in upper vehicle stowage. It is recommended that the ship's hoist be used to unload or load the RRCs. If ship's hoist can not be used, two 2-ton electric hoists are provided for use on ship's monorails (or the cradle I-beam). Also supplied are two 2-ton manual chain hoists which may be substituted for electric hoist in the event of a power failure, or hoist malfunction. Each cradle has 22 keel rollers spaced evenly along the length of the center beam. The keel of the RRC will move over the keel rollers as RRCs are moved to aft end of the row of cradles for down loading. A grated metal walk way is arranged parallel to and on either side of the center beam. Outboard of walk ways, bunker boards run the length of RRC cradle and help balance RRC on its keel. Personnel accommodation steps are provided on corner post of the cradle. Removable grated metal catwalks are affixes to side rails of the middle and top cradles.

204. **STOWAGE CONSIDERATIONS**

a. The starboard upper vehicle stowage area (3rd deck) is the recommended RRC cradle location based on past experience and may vary slightly aboard each LPD class ship. The controlling factor for the cradle location is the ship's existing overhead monorails/ bridge cranes. The combined fifteen cradles, in stair stepped tiers of up to three high, must be centered under the middle monorail beam on the starboard side of the upper vehicle stowage, (i.e., between monorail number 1 and number 5). This will position the cradles 46-3/4 inches inboard of the starboard longitudinal bulkhead. With the aid of modified monorails, this location enables the Marines to lift the RRCs straight out of the boat cradles with minimum difficulty. This location also allows sufficient amount of space between the starboard longitudinal bulkhead and the cradles for fire fighting and bulkhead stowage access.

b. The recommended procedure for placement and assembly of RRC boat cradle aboard LPD 4 class ships is as follows (6-5-4 configuration):

(1) Place six cradles on the bottom tier, five cradles on the middle tier and four cradles on the top tier.

(2) The bottom cradles should be centered on the middle monorail beam starboard side upper vehicle stowage deck. The first cradle should be placed one to two feet from the edge of the beach ramp. Place the next four cradles in line with the first cradle working from aft forward At the discretion of the ship's captain, a 24 to 36-inch athwartship fire lane can be left between the stacks adjacent to the cargo doors. Maintain alignment with each cradle.

(3) The sixth cradle is lifted over steel beach and placed in line with the first cradle extending aft. A special cradle support (H-frame) provided by the Raid Company will be used to

support the aft end of the cradle. The forward end of the cradle will be supported on the upper vehicle deck edge and butted up against the first cradle.

(4) Starting from forward, place the next five cradles on the middle tier. This will leave the sixth cradle on the bottom tier open.

(5) Again starting from forward, place the next four cradles on the top tier. This will leave the fifth cradle on the middle tier open.

(6) The staggered RRC boat cradle system allows the bottom and middle tier boats to be lifted out in an easy and efficient manner.

(7) RRC boat cradles will be put in place by use of ship's RT6000 fork-lifts and experienced operators.

(8) When securing RRC boat cradles with gripes, care must be taken to gripe each side simultaneously in order to maintain cradle alignment. Misalignment will restrict movement of boats through cradle assembly.

(9) RRC boat cradles rest on 12-inch by 2-inch by 96-inch long single planks (Douglas fir) placed under each set of transverses. This will accomplish a double purpose; first, it provides a crushable platform for the cradles to rest on without damaging the non-skid deck; second, it allows the cradle longitudinal members to flex independently when the ship pitches in heavy seas. Dunnage for RRC cradles must be provided by embarking unit.

(10) Each RRC is equipped with three sets of adjustable nylon strap assemblies to secure the boat to the cradle. Two straps aft of the boat and one forward restrict the boat from surging forward or aft and also secure the boat firmly on the cradle.

c. The recommended procedures for placement and assembly of RRC boat cradles aboard LPD 1 class ships is as follows (4-4-1 configuration):

(1) Place four cradles on the bottom tier, four cradles on the middle tier and one cradle on the top tier.

(2) The bottom cradles should be centered on the middle monorail beam starboard side upper vehicle stowage deck. The first cradle should be placed on the edge of the beach ramp. Place the next three cradles in line with the first cradle working from aft forward. Maintain alignment with each cradle.

(3) Starting from forward, place the next four cradles on the middle tier.

(4) Starting from aft, place one more cradle on the top tier of the last column of cradles.

(5) RRC boat cradles will be put in place by use of the ship's RT6000 fork-lifts and experienced operators.

(6) When securing RRC boat cradles with gripes, care must be taken to gripe each side simultaneously in order to maintain cradle alignment. Misalignment will restrict movement of boats through cradle assembly. Ensure to secure RRC boat cradles for open sea.

(7) RRC boat cradles rest on 12-inch by 2-inch by 96-inch long single planks (Douglas fir) placed under each set of transverses. This will accomplish a double purpose; first, it provides a crushable platform for the cradles to rest on without damaging the non-skid deck; second, it allows the cradle longitudinal members to flex independently when the ship pitches in heavy seas. Dunnage for RRC cradles must be provided by embarking unit.

(8) Each RRC is equipped with three sets of adjustable nylon strap assemblies to secure the boat to the cradle. Two straps aft of the boat and one forward restrict the boat from surging forward or aft and also secure the boat firmly on the cradle.

205. **BOAT HANDLING EQUIPMENT**

a. Monorails/Bridge Cranes

(1) Monorails can be reconfigured to handle RRCs by removing both hoist assemblies forward of the monorail car. Two new connecting bars can be made by the ship's force to maintain the required distance between the after hoist and the monorail car. A connecting bar of 42 inches will be used to connect the two hoist assemblies and is place approximately 86 inches between hooks (which is the distance between lifting pads in the boats). A second connecting bar of 8.5 feet long, will be used to connect the cab to the aft hoist assembly. This length will maintain a distance of 1.5 feet between the bow of boat and monorail car when hoisted.

(2) Monorail hoist limit switches must be modified/reset to lift boats out of the top tier of RRC boat cradles.

(3) Sections of monorail electrical power tracks will be required to be removed and insulated in order to prevent electrical shock to personnel working on top tier boat cradle.

b. 115V AC Outlets for Two RRC Electric Hoists

(1) A two receptacle outlet will be required at frame 168 (approximately 3 feet aft of a vertical ladder) and two more outlets are needed at frame 250 on the longitudinal bulkhead 25 feet to starboard of center line at 4 feet above the catwalk in the

well deck. There is a 115V load center panel (2-168-1) - 1L-F which may be used to feed the two outlets at frame 168 and then run aft to feed the two outlets at frame 250. Each outlet is required to provide 14 amps full load current at 115V, single phase for each hoist. Cable LSDSGU-9 is recommended due to voltage drop considerations.

(2) List of materials

(a) Receptacle, single, 15A, 125V, 2-pole, grounded, watertight, NAVSEA Symbol 735.3. MIL-R-2726/47, NSN: 9N5935-00-280-2390. Quantity - 4.

(b) Mating Plug NAVSEA Symbol 720.3. 15A, 125V, 2-pole, grounded, MIL-R-2726/50. (This plug has a securing cap to secure the plug after it is inserted into receptacle.) Quantity - 2.

(c) Cable LSDSGU-9 NSN: 6145-01-202-2796. Quantity - 400 feet.

(3) The looping system for flexible power cord devised by the Marine Corps works satisfactorily, hence there is no need for retractable power cord reels.

c. RRC Dolly. The dolly is constructed of tubular steel and provides a means of transporting the RRC between the cradle and the LRD. The dolly is composed of two 58.5 by 24-inch rectangular end-frames joined by two 6-foot lengthwise beams. Each end-frame is supported by four solid rubber caster wheels, with swivel locks and brakes. Each end-frame includes two padded supports, one on each side, for the RRC to rest on. The dolly has towing rings attached to either end-frame. The two 6-foot beams are connected to the end frames with two quick release pins on each end to provide optional rigid, or flexible, configuration. The dolly mounted RRC moves easily on the well deck.

d. Rigid Raiding Craft (RRC), Launch and Recovery Device (LRD)

(1) The launch and recovery device (LRD) is designed to allow for dry well RRC operations from LPD class ships without ballasting down and emptying the well deck load. The LRD is erected on the stern gate of the ship. The LRD is constructed of light weight aluminum alloy to facilitate its assembly and disassembly. Rubber cushions and air filled fenders are used to cushion the impact of the RRCs and to protect their Fiberglass hulls. A 150-foot recovery line and float is provided to establish a connection to the RRC being recovered. A boat positioner is provided to attach to the LRD during recovery to stop, secure and position the RRC correctly over the dolly. A 30-foot dolly tow line is provided to facilitate pulling the dolly and RRC out of the LRD and in the well deck to complete the recovery evolution.

(2) The LRD designed and built by MCLB Albany, Georgia is used to guide and stabilize the RRC as it is launched or recovered. It is manually installed on the stern gate and consists of a set of reinforced, funneled frames, and a steel track to guide the RRC dolly. The LRD can be disassembled into 46 parts for ease of removal and storage. During launch and recovery the entire system is secured to the LRD mounting pads which have been welded on the stern gate using T-bolts.

(3) The LRD frames are tapered toward the front so that their top portions stand horizontally above the water when the stern gate is submerged. They are intended to channelize the boat's forward movement as it approaches the ship from astern and position it above the submerged dolly for recovery.

(4) Launching RRCs. With the LRDs assembled on the ship's stern gate in the horizontal position, the dolly with RRC is pushed in the LRD stern first. When chocks are installed to hold the dolly in place, personnel enter the boat with their gear. The stern gate is lowered until the boat propellers are underwater. The boat motors are started and the stern gate is lowered to the stop. When the boat floats free of the dolly pads the boat is backed out of the LRD and proceeds on the mission. The empty dolly is removed from the LRD after the stern gate is raised to the horizontal position and the wheel chocks removed. The next dolly with RRC is loaded in the LRD for launch. This procedure is repeated until all RRCs are launched.

(5) Recovering RRCs

(a) With LRD assembled on the ship's stern gate and the stern gate in the horizontal position, an empty dolly with tow line installed is placed in the LRD and wheel chocks are installed to hold the dolly in place.

(b) The boat positioner is pinned to the forward track section and the 150-foot recovery line is installed in the boat positioner.

(c) A float is attached to the line.

(d) When the RRC approaches the LRD, the recovery line and float are thrown to the RRC.

(e) Personnel aboard the RRC recover the line and float from the water and remove the float with snap hook from the recovery line.

(f) The recovery line is then connected to the boat bow line using the pear shaped snap hook on the bow line (small end of the snap hook must go toward recovery line).

(g) The lines are then thrown back into the water.

(h) Rope handlers in the ship's well deck pull slack out of recovery line and maintain a taut line.

(i) The stern gate is lowered to the stops.

(j) The RRC is driven into the mouth of the LRD. The rope handlers continue to pull the RRC until the bow of the RRC is firmly pulled against the boat positioner. Once in position, the stern gate is raised. As the boat begins to come out of the water, the engines are switched off and raised.

(k) The stern gate is raised to a position five degrees above horizontal.

(l) The recovery line, boat positioner, and wheel chocks are removed and the dolly with RRC is pulled out of LRD and into the ship's well deck by the line handlers of the launch and recovery team.

(m) An empty dolly is loaded in the LRD and the process is repeated until the RRCs have been recovered.

e. Electric Hoist System. Two 115V AC electric hoists organic to the raid company can be used to hoist or lower RRCs from cradles in the event of modified monorail casualty. The operation of the electric hoist is presently a less than satisfactory means of inserting and removing the RRCs from their cradles. Both the pendulum effect created by the suspended boat and the two point anchoring arrangement endanger hoist team personnel in any sea state. Additionally, the electric hoist system is slow and cannot keep pace with the current launch and recovery system.

f. Stern Gate. With the installation of launch and recovery device (LRD), the current LPD stern gate design/configuration can support RRC operations under the following conditions:

(1) In sea state one, two LRDs can be installed to simultaneously launch and recover two RRCs.

(2) In sea states above one, only one LRD should be installed to launch or recover.

(3) The main hydraulic pump electric motors can only be operated for a total of 15 minutes per hour running fully loaded. The motors are not designed or rated for continuous duty. Standard RRC launch/recovery procedures with intermittent pump operation should not exceed hydraulic pump motor design criteria.

(4) The lower gate cylinder isolation stop valves located on the hydraulic piping at each end of the cylinders should be in the "open" position and never be closed to "lock" the stern gate when at sea.

(5) The hydraulic fluid temperature should not exceed 150 degrees F as measured at the pump discharge.

(6) Both main hydraulic pumps must operate concurrently.

(7) Ensure all PMS for the hydraulic system is current. This includes:

(a) Hydraulic oils clear and bright.

(b) Filter differential pressure is within specification.

(c) Gauges and thermometers are calibrated.

206. **SHIPBOARD SAFETY**. Safety has always been a paramount issue aboard U.S. Navy ships. In order for all personnel to take appropriate accident avoidance measures, the potential safety hazards are identified as follows:

a. RRC Stowage and Fuel

(1) It is noted that RRC boat cradles and stowage method are not designed to sustain shipboard grade "A" battle shock.

(2) RRC boat cradles are stowed three tiers high and each RRC has 56-gallon fuel tank.

(3) A potential safety hazard exists with the stacking of boat cradles. These were not designed for shipboard grade "A" battle shock requirements. Should the stacked RRC cradles collapse, a possible conflagration could erupt because of a fuel spill from the RRC fuel tanks. In order to prevent this catastrophe from happening, the following guidance is provided:

(a) The existing LPD MOGAS defueling pump and its associated piping are not capable of defueling gasoline from the RRCs. To defuel the craft would require modifications to the MOGAS station for defueling. To minimize the safety hazard, designate the area where the RRCs are stowed as a gasoline hazard area and limit RRC fuel to a maximum of 95 percent tank capacity and a minimum of 75 percent tank capacity while in cradle.

(b) If required, defueling gasoline from RRC can be done by using a hand operated stripping pump into a jettisonable gasoline tank.

(c) A stowage alternative to help reduce the potential fire safety issue is to place the cradles one high. The gasoline hazard still exists, but at a less critical level. Placing three rows of cradles would, however, consume valuable cargo space.

b. Ventilation Requirement:

(1) All upper vehicle stow vent fans must be operated connuously when the RRCs are stowed in the cradles. If any vent fan is secured while the RRCs are stowed, then the vicinity of the associated duct must be checked for explosive vapor concentrations

before restarting the fan. If necessary, ventilate with Red Devil blowers to reestablish safe conditions before restarting the fan.

(2) Establish positive ventilation in the upper vehicle stowage deck and negative ventilation in the well deck for 30 minutes prior to commencing any fueling and defueling evolutions. (The flow of air should be from upper vehicle to the well deck.)

c. Electrical Shock. Monorail electrical power tracks present an electrical shock hazard to personnel working on top tier of RRC boat cradles. To eliminate this safety hazard, three 6-foot sections of power track at the after end of the top tier RRC boat cradle should be temporarily removed. In addition, any track aft of the boat cradles that personnel could inadvertently come into contact with should be wrapped in electrical matting and taped.

d. Personnel Working Aloft on RRC Boat Cradles. Personnel working on top tier of RRC boat cradles must wear protective head gear, safety "H" harness and attached to a life line spanning from forward to aft. In addition, non-skid strips must be affixed to the surface of the RRC boat cradle top tier.

207. **FUELING AND DEFUELING**

a. Fueling

(1) A primary factor that favors deployment of RRCs aboard an LPD, vice other ship classes, is fuel. During a six month deployment or major training exercises, a large volume of MOGAS would be consumed in RRC operations. Currently, LPDs deploy with approximately 17,000 gallons of bulk MOGAS.

(2) Each RRC has an 56-gallon aluminum fuel tank permanently installed under the cockpit floor. The fuel hose runs transverse to the shell to another 90 degree hose fitting then up to the fill cap recessed in the port gunnel. A mechanical sight gauge, located in the center section of the tank cover, is provided for monitoring fuel status. This gauge will provide an approximate reading of the amount of fuel ONLY when the boat is level. The fuel tank does not have a drain plug in the bottom of the tank. Should it be necessary to defuel the craft before being stowed in the cradles than a modification to the fuel tank is necessary in order to siphon the gasoline out of the tank. The craft has a built-in gasoline grounding system between the fill pipe (gasoline nozzle contact) and the fuel tank down through the hull to sea water.

(3) When fueling the tank, a funnel, preferably with a strainer, should be used. Regular, leaded or unleaded and premium unleaded automotive gasoline with minimum ratings of 87 anti-knock index (AKI) in the U.S. and 90 research octane number (RON) outside the U.S. are preferred, providing they do not exceed a content of ten percent ethanol or five percent methanol alcohol.

(4) RRCs may be refueled over the starboard side of the ship, in the will deck prior to restowing, or in the RRC cradles.

NOTE: Refueling in the cradles is prohibited except in emergencies, at the discretion of the ship's captain. In sea state 0, refueling over the side of the ship is preferred. Refueling in the well deck, in the vicinity of the stern gate, is the next best option.

For tactical and safety considerations, RRCs will be refueled as soon as possible; preferably before entering the well deck.

NOTE: RRC fuel tanks are non-collapsing and internal to the craft. They shall be maintained at 75 to 95 percent capacity (temperature dependent) when being stowed on board.

(a) Over the side refueling is accomplished using the starboard flight deck access hatch from the MOGAS refueling station.

1 The assistant coxswain will attach a 2-1/2 inch line (with an 8-inch eye) which has been lowered over the side of the ship to the RRC and connect it to the internal bow eye to act as a sea painter. The coxswain shall maintain control over the RRC throughout the refueling evolution.

2 The fuel line will be lowered over the side of the ship to the RRC. The assistant coxswain will conduct the refueling and determine fuel flow.

(b) Refueling in the well deck is accomplished utilizing MOGAS fueling station located in the 2nd deck starboard catwalk at frame 2-172-1. The existing MOGAS pump takes suction from the gasoline draw-off tank and delivers the gasoline to the MOGAS fueling stations. Fueling operations shall be conducted at the after end of the well deck, aft of the water barrier.

(c) MOGAS can be dispensed through a one inch diameter nozzle gas station trigger type assembly or a Marine Corps flex cell hose assembly connected to the ship's 1.5-inch fuel hose.

(d) MOGAS refueling safety procedures are listed as follows:

1 Establish negative ventilation in the well deck with exhaust to outside 30 minutes prior to start of refueling operations.

2 Put smoking lamp out through the ship and secure all welding, burning or grinding.

3 Close cargo doors and post guards to prohibit unauthorized traffic through upper vehicle stowage and well deck.

4 Close elevator and pallet conveyer doors to maintain fire boundaries.

5 Station aviation fuel team and an AFFF hose team. The associated high capacity foam station and conflagration station shall also be manned. Additionally, a fire party shall be stationed outside the immediate refueling area where they can observe, but not be injured by, any explosion. When refueling aft of the water barrier, the fire party should be stationed in upper vehicle stowage at the top of the false beach.

6 Establish communication with the bridge and conflagration station on sound powered phone circuit.

7 Cease all other operations in the upper vehicle/ well deck area and clear out all unnecessary personnel.

8 Commence refueling RRCs. Recommend refuel to a maximum 95 percent capacity due to MOGAS spillage noted through tank vents during heavy weather and a minimum 75 percent capacity in order to prevent excessive MOGAS vapor build-up in tank.

9 Monitoring During Refueling.

a Monitoring personnel - Landing Force personnel under the direction of the DCA. All personnel PQS qualified in operation of explosimeter.

b Monitoring instrument - type E Gas monitor (combustible gas indicator (explosimeter)).

c Monitor frequency - each location every 5 minutes during the operation.

d Monitor location - 6 to 12 inches and 6 feet from deck and within 4 feet from the boat being refueled/defueled at 000, 090, 180, 270 degrees relative to the boat.

e After conclusion of refueling/defueling operations, the well deck aft of the beach shall be checked once for residual fumes by testing all corners and low spots with the explosimeter. This shall include random testing in and around all craft/vehicle stored in the well deck aft to the beach.

10 Any spillage that occurs during refueling/ defueling shall be immediately cleaned up. The following procedures will be used in the case of spillage:

a Cease fuel handling.

b Contain the spill by use of absorbency.

c When all standing fuel is absorbed, take the wetted absorbency to the stern gate area to evaporate. The absorbency can be transported to another weather area if placed in an approved 6-gallon oily waste can (NSN 907240-00-282-8411). The route to the new weather area must be approved by the ship's DCA.

d Use forced ventilation (air hose or Red Devil blower) to dry remaining fuel from deck. The same means may be used to speed drying of the absorbent material.

11 The stern gate should be open during all fueling/defueling operations since MOGAS fumes are heavier than air and tend to collect aft near the stern gate.

(e) MOGAS fueling operations should not be conducted during flight operations.

(f) Clean up any spillage. Restow the fuel hose. Maintain fire precautions and hose team on station until the well deck is certified clear by a gas free engineer.

b. Defueling

(1) Existing LPD MOGAS defueling pump and associated piping is not capable of defueling gasoline from the RRCs.

(2) If required, defueling of gasoline from RRC can be accomplished by utilizing a hand operated stripping pump and jettisonable gasoline tanks. When all fuel has been removed, fill the RRC gas tanks with inert gas.

(3) When defueling operations are conducted, additional provisions shall be made for stowage and handling of all fuel removed from the boats. Although the best procedure is to dispose of collected fuel over the side, this method of disposal will only be used when tactical circumstances warrant such action. Routinely, fuel will be collected in 5-gallon gas cans and stowed in the forward portions of the catwalks where they can be jettisoned by one person in case of a general emergency. When these 5-gallon cans are carried to the catwalks from the well deck, or back to the well deck for refueling, the transportation is considered a fuel handling evolution. As such, the DCA must be notified, fire party standing by, and the transportation route approved by the DCA.

c. Ventilation. The existing exhaust ventilation system serving the upper vehicle stowage deck and well deck is adequate in both air quantity removed and duct work arrangement. However, it is not flash arrested not does it have explosive proof electric motors. During MOGAS fueling and defueling evolutions, a significant amount of gasoline vapors will be present in the fueling/defueling area. For 30 minutes prior to commencement of fueling and defueling evolutions, establish negative ventilation in the upper vehicle stowage deck and well deck.

d. Warning Plates. Place gasoline hazard warning plates marking the RRC storage and fueling areas in accordance with current directives.

208. **FIRE PREVENTION CONSIDERATIONS**. RRCs with MOGAS, wing wall JP-5/MOGAS fueling station, storage of LFORM POL drums, oil and fuel soaked well deck planks, and embarked vehicles/landing craft contribute to potential fire hazards. An effective fire safety program is a function of proper stowage, operational smothering system, readily available shipboard fire fighting equipment, frequent training of personnel, and enforcement of fire prevention policies and practices. One of the most important factors that can significantly reduce the possibility of a well deck/upper vehicle space fire is to establish an active program of fire prevention. A localized fire can rapidly engulf the entire upper/lower vehicle stowage/well deck space. Through the implementation and enforcement of the following measures, this danger can be significantly reduced:

a. Immediately isolate, repair and clean up any lube oil, hydraulic fluid, diesel or gasoline leaks.

b. Wipe up any spilled flammable liquids when the spill occurs and promptly dispose of the rags.

c. Maintain a fire lane in upper vehicle stowage forward from port to starboard and forward to aft.

d. Ensure that no water reactive flammables are stored in upper and lower vehicle stowage.

e. Embarked units will assign a 24-hour fire watch to upper vehicle. The following minimum procedures will govern the conduct of this watch:

(1) Explosive vapor concentrations will be monitored every four hours, 6 to 12-inches, and six feet from the deck at 20-foot intervals around the cradle structure. A minimum of 28 points will be monitored (each corner of each RRC cradle).

(2) The ship's DCA shall ensure embarked troops identified by the commanding officer of troops are trained and PQS qualified to operate equipment used to moniotr for explosive vapor concentrations (explosimeter). Additionally, the DCA is responsible to ensure the RRC stowage vicinity is properly monitored for explosive vapor concentrations.

(3) A hazardous condition of ten percent of lower explosive unit at any monitor point shall be reported to the commanding officer. Immediate action shall be taken to dilute/remove vapors by locating and securing the source of the vapors and ventilating the area. Natural ventialation through opening sideports and well deck doors is the preferred method. Also, explosion proof, portable blowers should be used.

f. Ensure all unused accesses are securely dogged to prevent the spread of fire.

g. Develop a "Well Deck/Upper Vehicle/Lower Vehicle Fire Doctrine" and exercise at sea and in port.

h. Air powered tools will be required for maintenance on the RRC. Electrical hand tools are not allowed in areas where MOGAS is stored (the entire upper vehicle storage area).

i. Well deck sprinkling zone 1 must be operational and capable of discharging AFFF.

j. No smoking in the vicinity of the cradle stowage area. Hot work will be conducted only with the permission of the ship's CO. This includes operating engines of other vehicles in upper vehicle stow.

209. **OVERVIEW OF LAUNCH AND RECOVERY OPERATIONS**

a. Ship Handling. The ship's stability is of prime importance for well deck RRC operations, particularly for launch and recovery evolutions. An appropriate heading (usually into the seas) must be found to achieve the best launch and recovery condition. In addition, winds may cause a cross swell; consequently, close coordination between the bridge and the well deck control officer (WDCO) is required. Minimizing roll of the ship is the major concern. Handling, launching and recovering RRCs can become extremely difficult in any sea state greater than sea state one. If possible, avoid ship course and speed changes during RRC launch and recovery operations. This reduces the possibility of cross wave action across the stern gate. The best conditions for RRC launch and recovery are achieved underway, headed directly into the seas. Underway speeds may vary from steerageway to greater speeds; sea conditions at the stern gate will dictate speed for launch and recovery (historically, 3-7 knots).

b. Communications, Command and Control. Hand-held portable radio and sound-powered phone communications should be established between the bridge and well deck control stations. When the well deck is ready, WDCO will request the bridge to maneuver the ship into the seas. Also, WDCO establishes communications with the RRCs through hand signals and/or voice via portable bull horn or ship's well deck public address (PA) system. Prior to the scheduled launch time, the commanding officer of the raid company should make a last minute "go" or "no go" determination based on the prevailing sea state and promptly convey his recommendation to the ship's commanding officer through the WDCO. Ship's commanding officer has the ultimate responsibility and authority to launch and recover RRCs.

c. Launch. Launch evolutions involve a joint effort between launch and hoist teams. In preparation for the launch, the hoist team removes the RRCs from their boat cradles and places them in the dollies at the base of the false beach. As the boats are loaded into the dollies, the rope teams line them up at close interval behind the LRD. One dolly per RRC is preloaded into the LRD with the stern gate at horizontal position. Once the boat is

preloaded in the LRD, boat team members board the RRC. The coxswain ensures his engines are trimmed all the way down. The assistant coxswain assists in the starting of engines as soon as the water intakes of each engine are submerged. The coxswain ensures that all boat team members keep their heads/arms/hands within the RRC. Additionally, he maintains his RRC in a straight/aligned direction while backing out of the trap. The launch speed is the function of time between the first and last RRC entering the sea. With the dolly mounted RRCs prestaged, a series of individual launches can be executed relatively fast with trained personnel.

d. Recovery. Recovery evolutions require a rope team to move the recovered dolly mounted RRC forward far enough to make room for next dolly to be LRD loaded. The hoist team then takes over and moves the RRC forward to the false beach for stowage in the cradles. The actual speed of recovery evolutions is a function of the rapidity of LRD retrieval and not of the ability to stow the boats once they are aboard. Therefore, the rope team must be immediately freed to continue with the next recovery.

210. **MOVEMENT OF RRC FROM CRADLE TO DRY WELL DECK**

a. Install forward and aft lifting bars on modified monorail.

(1) Ensure all pins are completely inserted and locked.

(2) Inspect center lifting plates. Ensure they are bolted and welded to prevent sliding.

b. Connect four steadying straps. Two forward and two aft.

(1) Connect nylon steadying straps (forward/aft/port/starboard) to outside handling rail.

(2) Two boat handlers per strap required to steady boat during movement.

c. Position monorail hooks over lifting points and connect hooks.

(1) Ensure lifting point rests in center of hook throat and self-housing latch is closed.

(2) Check hook blocks to ensure lifting wires are not fouled and are riding properly in sheaves.

d. Hoist boat slowly using monorail hoist.

(1) Maintain boat in a level, horizontal position at all times.

(2) Be prepared for sudden forward and aft movement of boat at any time.

(3) Recommend the RRCs remain no more than 1-1/2 to 2 feet above the deck while suspended during movement/transport.

e. Move boat aft down starboard monorail beam to dolly loading point (at the bottom of ship's false beach).

(1) Reconfigured monorail can travel aft to the curved monorail beam but due to the extension bars installed it cannot travel the curve section and is limited to starboard side only.

(2) Ensure all personnel remain clear of boat while handling.

f. Lower boat to well deck/dolly

(1) Boat handling team should steady boat to prevent tipping while boat is resting on keel.

(2) Unhook monorail hooks, raise hooks and send monorail forward for next boat.

(3) Unhook steadying straps and remove lifting bars.

211. **RIGID RAIDING CRAFT (RRC) AND ASSOCIATED EQUIPMENT DESCRIPTIONS** (See Appendix A)

212. **DETAILED DRY WELL LAUNCH AND RECOVERY PROCEDURES**. (See Appendix B)

213. **MOVEMENT FROM DRY WELL DECK TO RRC CRADLE**

a. Boat handling party repositions boat on starboard side under center monorail beam.

b. Install forward and aft lifting bars.

c. Install four steadying straps.

d. Position monorail hooks over lifting points and connect hooks.

e. Hoist boat slowly using monorail hoist and move forward to cradle.

f. Position boat in cradle centered on rollers.

g. Boat handling party controls boat while steadying straps and hooks are disconnected.

h. Remove lifting bars.

i. Boat handling party positions boat in cradle assembly as required.

214. **SAFETY DURING RRC LAUNCH AND RECOVERY OPERATIONS**. See paragraphs 105.a, 105.b, and 314.

OPERATIONAL PLANNING CONSIDERATIONS

OPERATIONAL PLANNING CONSIDERATIONS

300. **MISSION PROFILE**. The operational capability of the raiding craft (RRC/CRRC) clandestine amphibious raid is defined by the following mission parameters:

a. Launched from over-the-horizon.

b. Under total EMCON conditions preceding enemy contact, excepting emergencies and the necessity of communicating mission critical information.

c. At night.

d. In varying sea states, up to and including Sea State 3 (Beaufort Force 4).

e. Incorporating a clandestine landing and withdrawal.

f. Incorporating accurate navigation to a specific Beach Landing Site by non-electronic means.

g. Executed within six hours of mission receipt; meaning that the time from receipt of the execute order to the beginning of the raid craft launching phase is no longer than six hours.

301. **OPERATIONAL EMPLOYMENT**. RRCs and CRRCs are employed to land small, lightly-armed and lightly-equipped forces on undefended beaches for the purpose of executing an amphibious raid operation. This operation is against a limited objective, for a limited duration, and includes a planned withdrawal. The raid may be an independent operation or supporting operation. A raid may be executed to support an amphibious assault, a land campaign, or an air or naval campaign. Regardless of the general purpose of an amphibious raid, its specific aims normally provide for any or several of the following:

a. Psychological. A raid may be conducted solely for psychological reasons; e.g., to lift the morale of friendly military personnel and/or civilians. Such a raid may be particularly necessary at the outset of hostilities or later if friendly forces have been in a defensive posture for a long time. Raids conducted under such circumstances may pay dividends by keeping the operating forces "offensive minded."

b. Destruction. Raids may be employed to destroy certain targets, particularly those that are not susceptible to destruction by other means. Targets for destruction may include military or industrial installations, communication facilities, and transportation facilities such as bridges and tunnels.

c. Harassment. Raids can harass the enemy when they are directed against isolated posts, patrols, and headquarters to

capture or kill key personnel. In addition to such specific aims, harassment of the enemy may lower the enemy's morale.

d. Reconnaissance. Amphibious raids can gather information on hydrography, terrain, and the enemy to include his dispositions, morale, strength, movement and weapons.

e. Diversion. The raid may create a diversion in connection with strategic or tactical deception.

f. Evacuation. The amphibious raid may be used to evacuate individuals, including agents, or material.

g. Unconventional Warfare. A series of amphibious raids can be employed to establish, support, or coordinate unconventional warfare activities.

302. **TACTICAL EMPLOYMENT**. When planning the tactical utilization of RRCs and CRRCs, the significant inherent characteristics of each type of craft must be considered. The RRC has several capabilities superior to the CRRC; it can maintain greater speed (plan for a sea state 1 speed of 25 knots for RRC, 10 knots for CRRC), it is more survivable because of its more durable hull and dual engines, and it is capable of being employed as a machine-gun platform. Conversely, the CRRC has capabilities superior to the RRC. It's biggest advantage is that it is more practical for conducting insertion and extraction operations across surf zones. The CRRC can be driven into shallow water, picked up by its boat team, and carried onto the beach or into a hinterland cache site. Once the operation ashore is complete, it can be easily launched from the beach by its boat team. There are methods for landing Marines ashore through a surf zone with RRCs, but they are inherently more difficult. RRCs may be employed directly on a coastline, but should only be done when very benign surf conditions are encountered (when the significant wave height is one foot or less). The CRRC has an additional advantage in that it can be launched and/or recovered by an LCU, thus allowing for the employment of an LCU as an intermediate vessel. Based on these considerations, RRCs are best employed against targets accessible by protected waterways such as harbors, bays, or rivers. It is here, where the raid force becomes vulnerable to enemy fire from the land surrounding or adjacent to the inland waterway, that the RRCs advantages of speed, survivability, and machine-gun capability can be exploited. Considering the large number of targets of military value located in inland waterways (vice on a beach), the capability offered by the employment of RRCs is significant. CRRCs are best employed when surf zone negotiation is required and/or the situation warrants use of an LCU as an intermediate vessel. RRC/CRRC combinations should also be considered; CRRCs for landing the raid force ashore, RRCs for escorting purposes (command and control, safety support, gunboat security).

a. Tactical Loads. While the CRRC is advertised by its manufacturer, Zodiac, to be capable of transporting ten personnel,

no more than eight personnel, including coxswain and assistant coxswain, will be carried on raid operations. The optimum weight ceiling for the CRRC is 2000 lbs. Any weight above this significantly reduces the CRRCs efficiency. Experience has shown that eight Marines, with mission essential equipment, on average, comes closest to this weight ceiling. (This data pertains to the F470/55HP engine combination.) When using the RRC the recommended number of men is also eight. In a crowded RRC, those Marines in the forward positions are subjected to a greater degree of physical discomfort owing to the turbulence created by the effect of swell and wave activity. This is especially significant during long transit periods; the increased physical stress may summarily diminish a Marine's ability to perform once he has arrived at the objective site. The commander must also take into account the possibility of prisoners, casualties, and the evacuation of friendly forces. It is always prudent to have sufficient additional boat space to contend with any unforeseen contingencies. By carrying no more than eight personnel in either boat, a RFC could, for example, lose a boat to maintenance problems and still have room in other boats to spread load the personnel from the down boat across the remaining boats.

b. Coxswains. RRC and CRRC coxswains are trained in formal courses of instruction conducted at four locations; Landing Force Training Command, Pacific at NAB Coronado, CA; Landing Force Training Command, Atlantic at NAB Little Creek; II MEF (Special Operations Training Group (SOTG)) at Camp Lejeune, N.C., and III MEF (SOTG) at Camp Butler, Okinawa, Japan. Graduates of one of these courses (school code 81K) are the only personnel authorized to coxswain raid force RRCs or CRRCs without the express approval of the CATF and CLF.

c. Boat Team Members. Personnel assigned to the raid force must have a training background which qualifies them to participate in small boat tactical operations. These personnel must not be considered simply as passengers; they participate in various important aspects of the operation, notably amphibious ship launch and recovery, and surf zone negotiation, and must be familiar with small boat emergency and safety procedures. The following personnel should be considered as qualified boat team members:

(1) Graduates of a formal MEU(SOC) raid course.

(2) Personnel trained and certified by the raid force company commander.

(3) Personnel currently assigned to an ARG NSW detachment or a supporting USMC reconnaissance unit.

(4) Personnel trained and certified by III MEF (SOTG) amphibious raid instructors.

303. **COMMAND RELATIONSHIPS AND AMPHIBIOUS DOCTRINE**. The doctrine for amphibious operations, specifically for amphibious raids, set forth in reference (a), JCS PUB 3-02, Joint Doctrine for Amphibious

Operations (Chapters II and XV) and reference (b), FMFM 8-1 Special Operations, is applicable to the over-the-horizon, clandestine small boat raid. Overall command authority rests with the Commander, Amphibious Task Force (CATF). The CATF, in consultation with the CLF, must define the organizational relationships to be established between himself and the raid force company commander which is most conducive to the exercise of effective command and control; doctrine allows for flexibility in doing so to facilitate the exploitation of situational uniqueness. The C.O. of the vessel launching the raiding craft is responsible for their safety until such time as they reach the beach or are recovered aboard ship. However, the wide variation in the purpose of raiding operations and the consequent variation in the composition of the raiding force and associated naval forces, require a full description of the precise command arrangements which apply in each case." For example, the ARG/MEU (SOC) is tasked with the mission of conducting an <u>independent</u> raid operation. The CATF defines the command relationships as follows: CATF will exercise command and control of the launch and recovery phases of the operation through his launch and recovery ship captain, and all other phases of the operation through the CLF chain of command, with the raiding force launch/recovery ship captain standing by to receive on-order missions in support of the ship-to-shore and/or shore-to-ship phases. The raiding force launch/recovery ship captain is responsible to CATF for launch, recovery, and on-order taskings. The CLF is responsible to CATF for all other phases of the operation, and exercises command and control of the raid force directly, or through the battalion commander. As a contrasting example, the ARG/MEU(SOC) is tasked to conduct an amphibious assault, and is given authority to conduct a <u>supporting</u> raid operation against a diversionary target which is a considerable distance away from the amphibious assault objective area. The CATF defines command relationships as follows: CATF will exercise command and control through his raiding force launch/recovery ship captain to the RFC for all phases of the operation. In this case, staff planning cells, incorporating both Navy and Marine expertise, would be organized to assist in the planning sequence for the raid operation. This would be necessary to ensure thorough staff planning was accomplished for the raid, but not divert the attention of the entire staff away from planning for the amphibious assault. In defining command relationships, CATF and CLF are not limited to these two examples; quite the contrary, these examples are meant to convey the idea that CATF, in consultation with CLF, has the flexibility to tailor the command relationships for an amphibious raid which make the best tactical sense and which best exploit the unique circumstances of a given situation. The command relationships can be defined which best facilitate effective command and control and provide the greatest probability of success.

304. **<u>PLANNING RESPONSIBILITIES</u>**. When planning an over-the-horizon small boat amphibious raid, the raid force commander (RFC) must be the focal point from the outset. (**NOTE**: In this SOP, the term raid force commander refers to the commanding officer of the rifle company trained in RRC/CRRC amphibious raid capabilities).

The planning sequence must be characterized by continuous, parallel, concurrent, and detailed planning as set forth in amphibious doctrine. The RFC will need support, especially in terms of planning information, from the staff expertise available in both USN and USMC command organizations. Additionally, planning must be characterized by close cooperation and teamwork between Navy and Marine staffs. As the plan develops and is completed, all aspects should be briefed, reviewed, and understood by planners and decision-makers at every echelon of command, with final approval from the CATF. Appendix C, Planning For Raiding Craft Transit and Return, provides a planning sequence guide; this guide is notional in nature and should be modified as required. Appendix D is an operational planning checklist for RRC/CRRC amphibious raids. Thorough and careful planning cannot be over-emphasized; it takes on added importance in an operation characterized by long-range, low-visibility, EMCON considerations when the time available after receipt of the execute order is limited, and where positive control of the raid force is vested in the RFC for execution.

305. **CONTINGENCY PLANNING**. As with the planning of any tactical operation, provisions must be made to deal with uncertainty. Plans should be developed to address contingencies and emergencies during the ship-to-shore insertion phase, during the conduct of operations ashore, and during the shore-to-ship extraction phase. The following should be addressed:

a. Bump Plan(s)

b. Emergency reinforcement of the raid force.

c. Emergency extraction of the raid force.

d. Fire support to include the employment of close-in fire support (CIFS) from attack helicopters, close air support (CAS) and naval gunfire support (NGFS).

e. Electronic warfare (ESM, ECM, ECCM)

f. Emergency MEDEVAC procedures, both during the waterborne and onshore phases.

306. **SEA STATES**. The reference for understanding and judging sea conditions is reference (c), the American Practical Navigator (Bowditch), Volume I, Appendices V and W. This publication is available from the Defense Mapping Agency. The mission profile (see paragraph 300) for the raiding craft clandestine amphibious raid sets sea state 3 (Beaufort Force 4) as a mission parameter. The sea keeping characteristics of both RRCs and CRRCs permit operations in sea state 3, although it is important to understand that rough weather greatly increases the risks associated with launch and recovery of raiding craft. The maximum sea state for RRC/CRRC launch and recovery and ocean transits is sea state 3 (Beaufort Force 4). Sea state limits for launch and recovery of raiding craft are dependent upon significant wave/swell height and

resultant ship motion. Ship motion is the main criteria for raiding craft launch and recovery operations and as such, it is recognized that operating limits may be reached in significantly lower sea states. Another important consideration is that the high winds generally associated with higher sea states adversely affect the maneuverability of both types of raiding craft. Higher sea states and corresponding winds will result in raiding craft maintaining slower speeds, which mean longer transit times. The advantage offered by operating in higher sea states is a reduced vulnerability to detection by enemy electronic sensors; higher sea states will degrade the ranges at which electronic sensors are effective, thus facilitating the clandestine nature of the operation and contributing to tactical surprise. It's also important to understand that sea conditions can fluctuate rapidly; during the planning phase for an OTH operation, the forecasted meteorological factors that could adversely affect the sea state during the entire duration of the operation must be considered. For example, if it is anticipated that the sea conditions at the time of launch will be sea state 3, during the planning phase the question should be answered "Are there any forecasted meteorological factors which may cause the sea state to go to 4 or 5 during the duration of the operation i.e. after launch?" Another important consideration to understand is that sea states and surf conditions are not necessarily related to one another. A low sea state does not mean a benign surf zone. Surf zone considerations will be discussed in paragraph 310 below, but the point here is that sea state conditions and surf zone conditions must be considered independent of one another.

307. **DISTANCE**. The insertion point (IP) at which the raiding craft are launched from amphibious shipping in over-the-horizon (OTH) operations is generally considered to be approximately 20 nautical miles from shore. In determining the actual distance from the objective ashore from which to execute a launch, the sea state, weather, transit times, and enemy electronic detection capabilities should be considered. The point is: keep the amphibious ship protected and far enough away to prevent operational compromise, while at the same time, minimize the distance for the raid force in order to reduce the physical demands caused by long open-ocean transits.

308. **NAVIGATION**

a. In keeping with the mission profile parameter of EMCON conditions, the navigational method used by the raid force is non-electronic. Dead reckoning and coastal piloting are the primary methods of navigation for the raid force. Passive electronic methods of navigation i.e., LORAN C/D, or satellite navigation (GPS) are a useful complement; however, should not be totally relied upon due to problems in propagation, signals interpretation in adverse weather conditions, and delicacy of electronic instruments. Dead reckoning and piloting are defined as:

(1) Dead Reckoning. Dead reckoning is considered the basis of all navigation and is used aboard vessels of any size

regardless of the electronic navigation systems available. Dead reckoning is the process of determining the craft's approximate position by advancing a known position for courses and distances traveled.

(2) Piloting. Navigation involving the frequent and continuous determination of position by reference to landmarks and navigational aids. This process is similar to shooting a resection in land navigation.

b. The navigation (or piloting) team consists of three individuals; the navigator, assistant navigator and coxswain. All three should be well versed in small boat navigation and become intimately involved in the research and development of the navigational plan. Development of the navigational plan should include input from Host-Nation Liaison Officers familiar with the waters being navigated, if such officers are available. The raid force should employ a minimum of two, preferably three, piloting teams; one designated as the primary, the additional team(s) serving as backup and for double-check/cross reference purposes. This enables the raid force to have depth within their navigation capabilities. Once underway, the duties of the piloting team are specific:

(1) The navigator orders course and speed to the coxswain and keeps total time of passage. He operates the plotting board by plotting bearings, currents, DR plots, etc. He notifies the assistant navigator when to take bearings and speed checks, and he oversees the entire NAVPLAN and safe piloting of the vessel.

(2) The assistant navigator renders aid to the navigator as directed and is responsible for shooting bearings, measuring speed and keeping time between legs. The assistant navigator must be alert and observant of sea conditions, aids to navigation and land features.

(3) The coxswain maintains the ordered course and speed.

c. A formal course of instruction in long-range maritime navigation is conducted by Landing Force Training Command, Atlantic at NAB Little Creek, VA and Landing Force Training Command, Pacific at NAB Coronado, CA. It is mandatory that an officer from the rifle company trained in raiding craft operations attend one of these courses or the III MEF (SOTG) navigator training. Additionally, eight other leaders, sergeant or above, will be trained as navigators. Graduates of these courses are the only personnel authorized to conduct raid force OTH navigation without the express approval of the CATF and CLF.

309. **STEALTH**. A basic premise of the small boat OTH amphibious raid program is its clandestine nature; the capability of the raid force to remain undetected or unidentified for a sufficient period of time necessary to achieve tactical surprise. This is the basis for the EMCON mission parameter; EMCON conditions are maintained

by the raid force preceding enemy contact. Radio communications are not used unless by exception, but even with exceptions must be minimized to the greatest extent possible. The exceptions are emergencies and/or the necessity of communicating mission critical information (information that has a direct impact upon the successful outcome of the mission). This parameter does not negate the necessity for positive radio communications; there must be a radio net linking the RFC to the CATFs controlling agency. The CATF must have the ability to pass new information or orders to the RFC; the RFC must have the ability to contact the CATFs controlling agency upon enemy contact, to execute a contingency plan, in the event of an emergency, or to pass some other piece of mission critical information. Further, there are no radar emissions; navigation is accomplished non-electronically as described in paragraph 308 above. Signaling internal to the raid force is accomplished with the aid of night vision devices, infrared lights, and directional lights, with an intra-company radio net serving as an alternate communications means (for use after enemy contact and for emergencies/mission critical information). With regards to enemy electronic surveillance and detection capabilities, it's important for planners and decision-makers to understand that it is essential to conduct a thorough analysis and detailed planning of raid target areas, to include an evaluation of the types and manner of employment of electronic sensors used by the enemy. Studies have shown that the raid force can be detected by a variety of sensors at tactically significant ranges which provide the enemy the time and opportunity to respond prior to the arrival of the raid force at its objective. A careful and detailed analysis of enemy surveillance and detection capabilities relative to the ambient environment in planned target areas is essential. The tactics employed by the raid force must be adopted to reduce vulnerability to enemy detection capabilities and/or counter enemy reactions to early detection. The determination of raid force transit and beach approach formations should be made with the knowledge that tightly bunched raiding craft increases vulnerability to detection. Employment of dispersed formations during high vulnerability periods will decrease detection probability. Additionally, operations in adverse environmental conditions and higher sea states will degrade the ranges at which electronic sensors are effective. The enemy's employment of listening posts/observation posts (LPs/OPs) and patrolling must be included in this analysis.

310. **THE SURF ZONE**. A key planning consideration for a raiding craft insertion will be the characteristics of the surf zone at the beach landing site (BLS). Detailed information on these characteristics can be found in reference (d). Surf zone conditions are reported by a Surf Observation Report (SUROB), described in Chapter 10, Meteorological Planning for Amphibious Exercises. (**NOTE**: SUROB is a 8-line report; the NATO format SURFREP is a 10-line report, the first two lines being unit of measure and DTG, the last eight lines corresponding to the 8-line SUROB).

a. SUROB Key Elements. The critical considerations for raid craft surf zone operations are the significant wave height (height of the highest one third of the breakers observed), the period

(the time interval between waves measured to the nearest half-second), and the breaker type (spilling, plunging, or surging). The higher the significant wave height, the shorter the period, the greater the percentage of plunging or surging waves, the greater the danger to raid craft surf zone operations. These critical factors must be considered both individually and in combination and their effect on raid craft operations carefully and prudently evaluated, especially in light of boat/engine maintenance conditions and coxswain/boat team experience level. This evaluation should be conducted by personnel trained and experienced in raid craft operations. It should also be understood that, although these three elements are the most critical considerations, the other information contained in the SUROB is important for navigation and surf zone negotiation planning.

b. Planning and Execution Considerations. SUROB collection should begin 72-96 hours in advance of the anticipated time of receipt of the raid execute order. In training situations, non-exercise/safety personnel can accomplish this so that the Raid Force can adhere to the 6-hour window mandated by the mission profile. During contingency operations, SUROB collection should begin as soon as possible. A SUROB should be collected every 12 hours, corresponding to the tidal conditions at the planned time of landing. U.S. Navy SEAL, U.S. Marine Reconnaissance (either force or battalion), raid force scout swimmer, and beach master personnel are trained and qualified to collect SUROBS. Surf conditions are a critical consideration in making the final determination to launch or not launch the raid force. Once the raid force is launched it will proceed either to: (1) A point a minimum of 50 yards seaward of a known historical surf zone at BLS; or, (2) a point a minimum of 250 yards seaward of the BLS when the historical surf zone is not documented or when the RFC cannot readily discern where the surf zone exists at the BLS. CATF is responsible for the decision to cross the surf zone, but he routinely gives the RFC the authority to make this decision. In either case mentioned above, the RFC will employ his own scout swimmers to provide a SUROB to facilitate a final surf evaluation prior to the raid force negotiating the surf zone. RF scout swimmers are not required when prepositioned USN SEAL or USMC Recon personnel are already at the BLS to provide post-launch SUROBS and terminal guidance to the approaching raid force. In addition to considering the BLS surf conditions as they exist at the time, the RFC must consider his mission and command guidance, boat/engine maintenance conditions, and coxswain/boat team training and experience level. As commanding officer of the raid force and the on-scene commander trained in this capability, he is best qualified to make the final beaching decision. It is important to understand that surf conditions, like sea conditions, can change rapidly. This necessitates evaluating the on-site surf conditions at the time the raid force arrives, even though pre-launch SUROBS were within limits. Additionally, during the planning phase, forecasted meteorological factors that could adversely affect surf conditions should be evaluated and planned for.

c. Surf Limits. As noted in paragraph 302 above, RRC operations should only be conducted in relatively benign surf (where the Significant Wave Height is one foot or less). Appendix E, MEU (SOC) Raid Force Recommended CRRC Surf Passage Table, sets forth recommended operating limits for CRRC surf zone operations. The table plots breaker height versus breaker period, and is applicable to both spilling and plunging waves, or combinations of both. As already noted, plunging breakers are more dangerous to raiding craft operations than spilling breakers, and greater care and judgment must be exercised as the percentage of plunging breakers increases. Surging breakers are not included in the table; a passage through surf of predominantly surging breakers of heights greater than two feet is not recommended. These recommended surf limits are set forth as a guide; they are not intended to usurp the judgment of officers exercising command.

311. **EMPLOYMENT OF SEALS, RECONNAISSANCE UNITS, AND RAID COMPANY SCOUT SWIMMERS**. U.S. Navy SEALS, USMC Force Reconnaissance Detachments, and USMC Reconnaissance Battalion platoons are most efficiently employed in advance operations supporting the amphibious raid. As noted in paragraph 310.b. above, they are qualified to collect SUROBS, and can be employed to do so 72-96 hours in advance of the anticipated time of receipt of the raid execute order. Further, these units may be employed to conduct advance BLS reconnaissance, route reconnaissance between the BLS and the target, and as eyes-on-target, collecting intelligence data in the objective area. When USN SEAL or USMC Recon personnel are unavailable to provide a final SUROB and terminal guidance to the BLS, the RFC will employ the raid company's own scout swimmers to facilitate the clandestine movement of the raid force ashore; they validate the correct location of the BLS, conduct the initial reconnaissance of the BLS for the raid force and establish initial security, conduct final SUROB if required, and, mark the BLS with directional lighting and signal the raiding craft ashore. The raid company's scout swimmers are the ones best employed to perform these functions; they have trained extensively with their company, have a clear appreciation of their company's experience level and capabilities, and are well-versed in the company's standard operating procedures. The inherent capability of the raid company to transition itself ashore and establish itself on the BLS frees the SEALS and reconnaissance units for their traditional roles, and increases the probability of success because of procedural familiarity. Formal courses of instruction in MEU (SOC) amphibious raid scout swimming is conducted at Landing Force Training Command, Pacific at NAB Coronado, CA; Landing Force Training Command, Atlantic at NAB Little Creek, VA and at III MEF (SOTG). Each raid company will train a minimum of 9, a maximum of 15, first-class swimmers in this course to support its RRC/CRRC raid operations. The scout swimmer cadre will include at least one company officer, who will be designated as the company's Chief Scout Swimmer (CSS). Graduates of these courses are the only personnel authorized to conduct scout swimmer operations for the raid force without the express approval of the CATF and CLF.

312. **ENEMY SITUATION**. As with any tactical operation, the strength and deployment of enemy forces in the raid target area must be analyzed in detail. This analysis should address enemy weapons systems, security arrangements, and activities and routine. As discussed in paragraph 309, a detailed analysis of the enemy's employment of electronic sensors for coastal surveillance and early warning is essential. This evaluation should include both the type of sensors employed, and the manner in which they're employed. Further, the enemy's probable response to a raid, and his capability to react with reinforcements, either ashore or at sea or both, must be evaluated and contingency plans developed accordingly.

313. **LANDING AND WITHDRAWAL TECHNIQUES**. The specific technique used for landing the raid force ashore, and withdrawing it after completion of the mission, will be situation dependent. It should be tailored to achieve a balance of speed and stealth appropriate to the mission, enemy, terrain, and meteorological factors. During the landing phase, the raid company scout swimmers will be employed to facilitate the movement of the raid force ashore as discussed in paragraphs 310 and 311 above.

314. **SAFETY**

a. General. Raiding craft operations are inherently dangerous; yet, the history of such operations shows that Marines and sailors are at a greater risk riding in aircraft, driving to work, etc., than they are crossing the ocean at night in small boats. The reason for this safety record is training. Personnel in MEU(SOC) raid companies are screened for their swimming skills. They are then put through a rigorous, and progressive, training program producing Marines and sailors that can operate safely within the parameters of the mission profile mandated by CMC. This progressive, demanding training program must be continuous. Even on deployments, raid companies must practice to keep their swimming skills and emergency procedures finely tuned. Time must be spent working on surf passages and surf swimming, capsize drills, man overboard drills, and the like. Rescue swimmers must practice their lifesaving skills and Marines and sailors must practice buddy rescues. The Panama work vest worn by all personnel in MEU(SOC) raid companies is made of Kapok-like material designed to float even an unconscious person indefinitely. As such, a man overboard, or a CRRC flipping in the surf is not necessarily an emergency situation. Proper training of the unit allows for these events to be overcome, and the mission continued. If a Marine or sailor cannot rescue himself, he relies on buddy aid. When this is not enough, his coxswain can direct all of the personnel in the affected boat to assist as necessary. If a situation is encountered that is more serious than is within his capability to correct, he can call upon the unit's rescue boat.

b. Safety Apparatus. It is imperative that every raid operation include a safety plan as an integral part in the event that an emergency develops requiring assistance beyond the means of the

raid unit's internal rescue capability. Proper safety apparatus allows for the MEU(SOC) raid force to train up to its mission profile without hindrances, yet protects the lives of Marines and sailors should the unforeseen occur.

(1) Peacetime Safety Apparatus

(a) The mother ship's watch personnel must be fully briefed on, and have a copy of the raid company's emergency procedures, to include radio distress signals, visual (pyrotechnic) signals, and an overall understanding of the operation's timeline and safety plan.

(b) Raiding craft operations, like AAV operations, have built in safety craft, i.e., one boat is the safety boat for another. However, the raid force should have, as part of its own organization, a designated rescue (SAR) boat. It is normally one of three specially designated boats. The "Alpha Boat" is the command boat from which the company commander commands. It is usually the lead boat. The "Bravo Boat" is the executive officer's boat and is usually the last boat in the tactical formation. It usually has a mechanic on board. The "Charlie Boat" is normally the rescue boat. It is located near the rear of the tactical formation, and carries personnel with tactical missions; however, it will carry specially designated rescue personnel. When the raid force reaches the surf zone, it will stand off, maintaining visual contact with the raid force, yet keeping far enough away so as not to become engaged with any emergency conditions encountered by the rest of the tactical element. Its purpose is to rescue. As such, it must be coxswained by one of the raid company coxswains. The "Charlie Boat" must be equal to or larger than the tactical raiding craft being utilized, and must be specially equipped and manned to perform its mission. Besides a surf capable coxswain and assistant coxswain, it must have an EMT qualified corpsman (capable of administering oxygen), an American Red Cross qualified advanced lifesaver (ARC ALS) or Marine Corps qualified combat safety swimmer (CSS), and a radio operator. It should also have a SNCO or an officer to make decisions in the event of an emergency. It must be equipped with a radar reflector (erected only in emergencies and/or when radar contact is lost with the PCS or the guide boat), specialized medical gear (O^2 resuscitator, backboard, blankets, etc.), rescue equipment (ring/ pull buoy's, towing lines, searchlight, etc.), and radio equipment.

(c) Depending on the distances covered, a "guide boat" may be necessary. This boat will normally be a LCPL. Its purpose is to allow the raid force's uninterrupted transit to and from the BLS by keeping all other sea traffic away, while ensuring a good radar plot of the raid force's position and keeping the CIC informed of the unit's progress/situation over the non-tactical safety net. It maintains radar contact with the raid force, but does not interfere with the tactical formation (When necessary, it can request the Charlie boat to raise its radar reflector). Its position is predicated on the situation. It normally travels

approximately a mile in trace of the raid force, but may travel to either side, or even in front of the raid force, when civilian shipping is present. In an emergency, it backs up the Charlie Boat, and supervises/assists as necessary. If distances are extremely long, or weather conditions adverse, additional guide boats may be added as deemed necessary by CATF.

(d) When available, a night hover capable SAR helo should be on deck alert either on the LPD, for advance force operations, or on the LPH/LHA when the entire ARG is present. Its pilots, as well as the HDC should be pre-briefed on all aspects of the safety and tactical plan.

(e) In most cases, particularly when making surf passages, it may be necessary/desirable to have safety support in place near the BLS. This could include a safety vehicle when ground evacuation is possible, or when a HLZ is some distance from the BLS. Corpsmen and safety swimmer support could also be present if necessary. A HLZ could be preselected and marked, and, another station on the safety net could be in place.

(2) Wartime Safety Apparatus. In wartime, due to EMCON and the possibility of compromise, much of the external safety apparatus will not be present. However, the raid force should still employ all of its internal safety measures, to include the Charlie boat. The contingency reaction force assets (LCAC or Helo) could be called upon for safety back up.

APPENDIX A

RIGID RAIDING CRAFT (RRC) AND ASSOCIATED EQUIPMENT DESCRIPTION

THE RRC IS AN 18-1/2 FOOT, HEAVY DUTY FIBERGLASS WORK BOAT. IT HAS A CENTER CONSOLE AND IS POWERED BY TWIN 70 HORSEPOWER OUTBOARD MOTORS. POWER TILT AND TRIM, COMBINED WITH OTHER COMPONENTS AND ACCESSORIES, PROVIDE A COMPLETE OPERATIONAL CRAFT DESIGNED FOR AMPHIBIOUS OPERATION IN OFF-SHORE WATERS AND SURF AREAS IN UP TO SEA STATE 3 CONDITIONS.

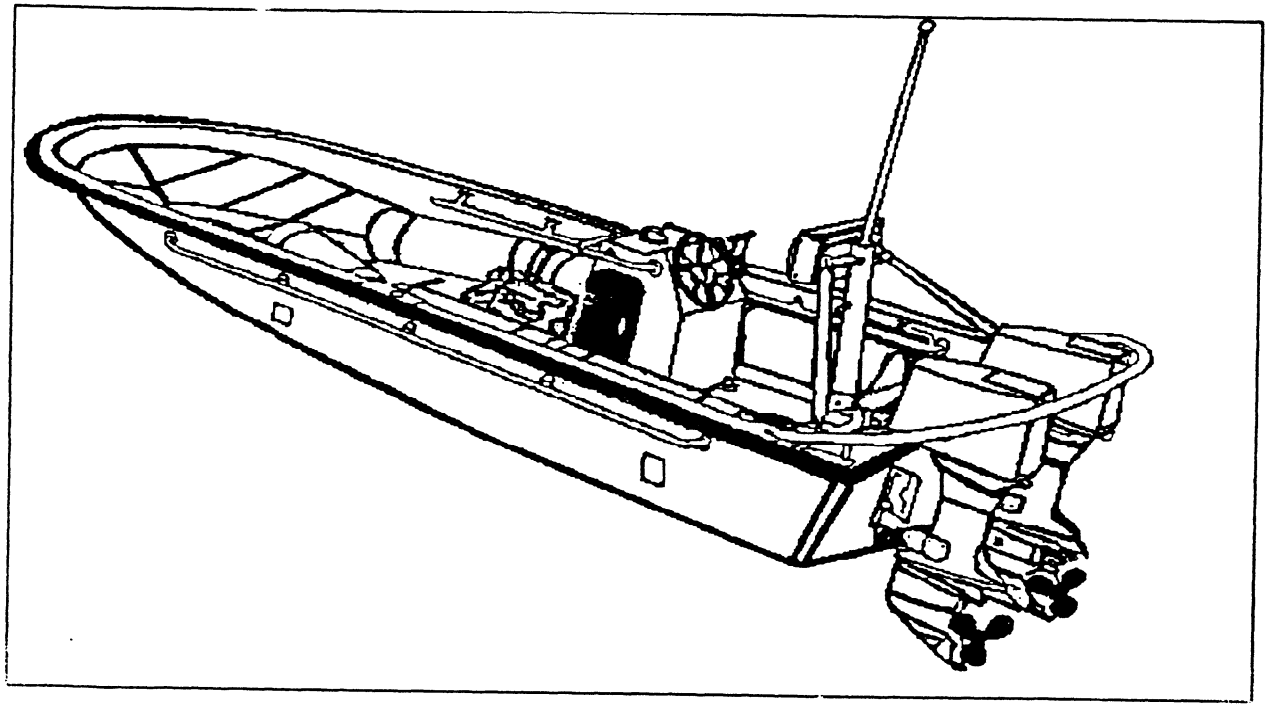


FIGURE 1. RRC BOAT PROFILE

RIGID RAIDING CRAFT (RRC) GENERAL INFORMATION

LENGTH	18 FEET, 6 INCHES
BEAM	7 FEET, 2 INCHES
DRAFT	18 INCHES
PROPULSION	TWO MODIFIED OMC OUTBOARDS
HORSE POWER RATING	70 HORSEPOWER PER MOTOR
FUEL CAPACITY	56 GALLONS
MAXIMUM SPEED	20+ KNOTS
PERSONNEL ACCOMMODATION	1 COXSWAIN (MARINE) AND 9 COMBAT-LOADED MARINES

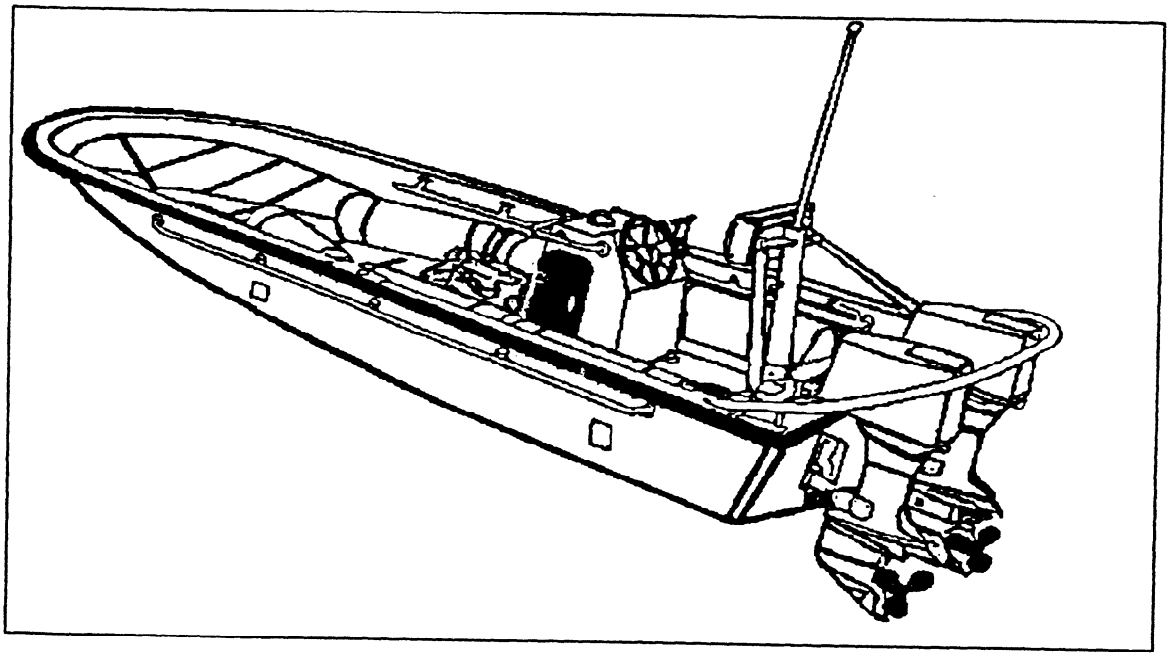


FIGURE 2. RRC BOAT CHARACTERISTICS

RIGID RAIDING CRAFT (RRC) STOWAGE SYSTEM
(6-5-4 CONFIGURATION)

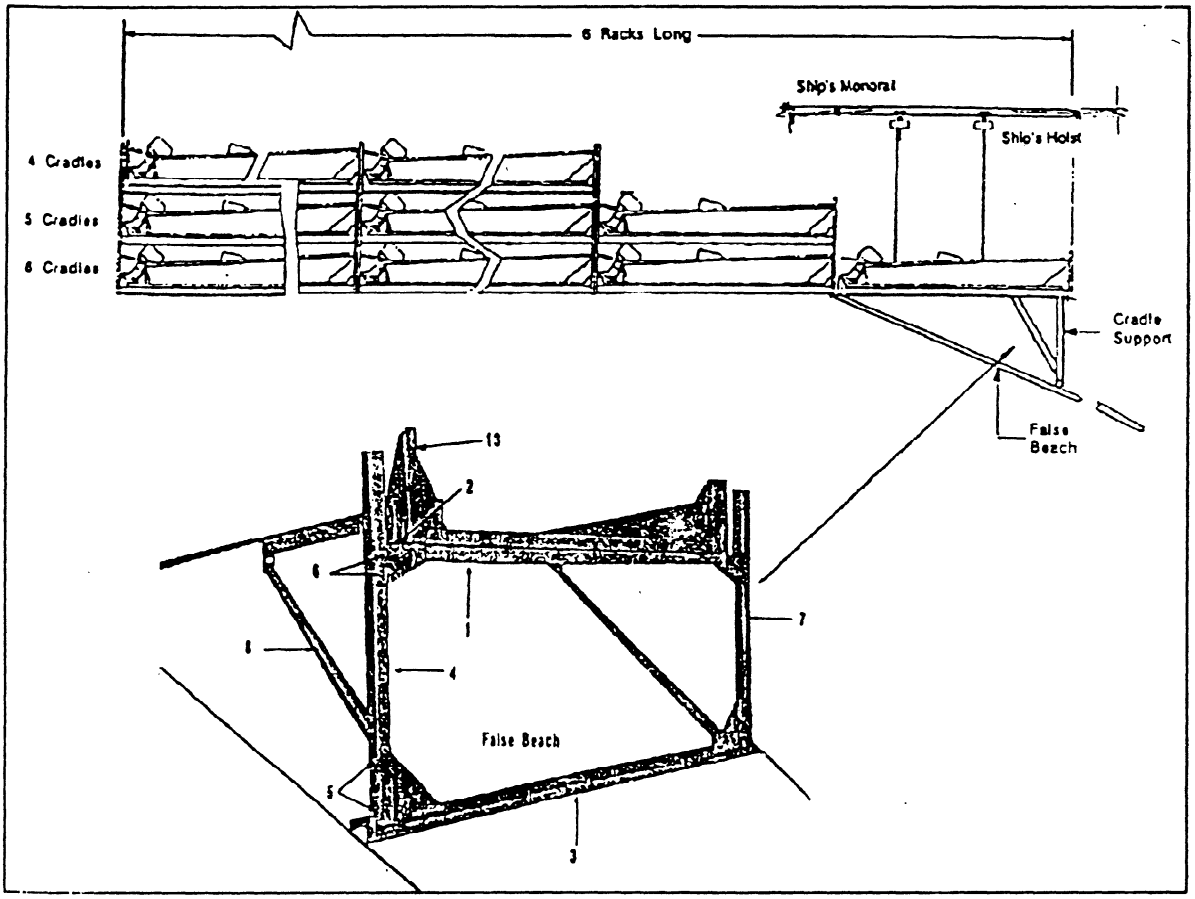


FIGURE 3. RRC CRADLE PLACEMENT AND STACKING METHOD
(FOR LPD 4 CLASS SHIPS)

RIGID RAIDING CRAFT (RRC) STOWAGE SYSTEM
(4-4-1 CONFIGURATION

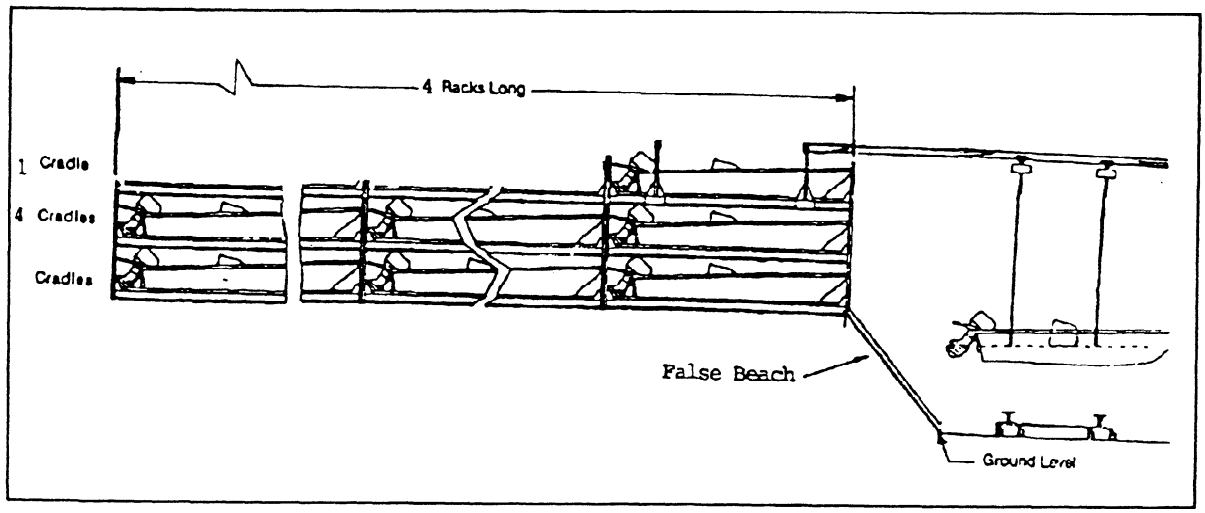


FIGURE 4. RRC CRADLE PLACEMENT AND STACKING METHOD
(FOR LPD 1 CLASS SHIPS)

RIGID RAIDING CRAFT (RRC) STOWAGE SYSTEM

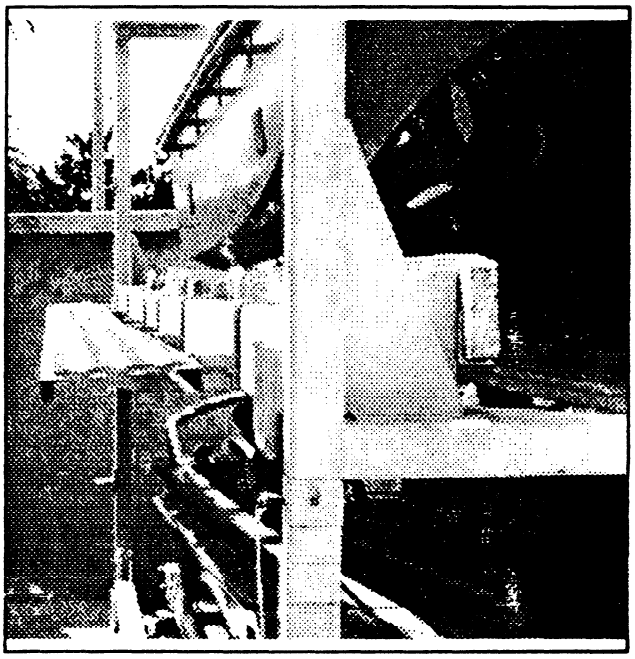


FIGURE 1. RRC CRADLE AND GRATED METAL CATWALK

MONORAIL SUPPORT

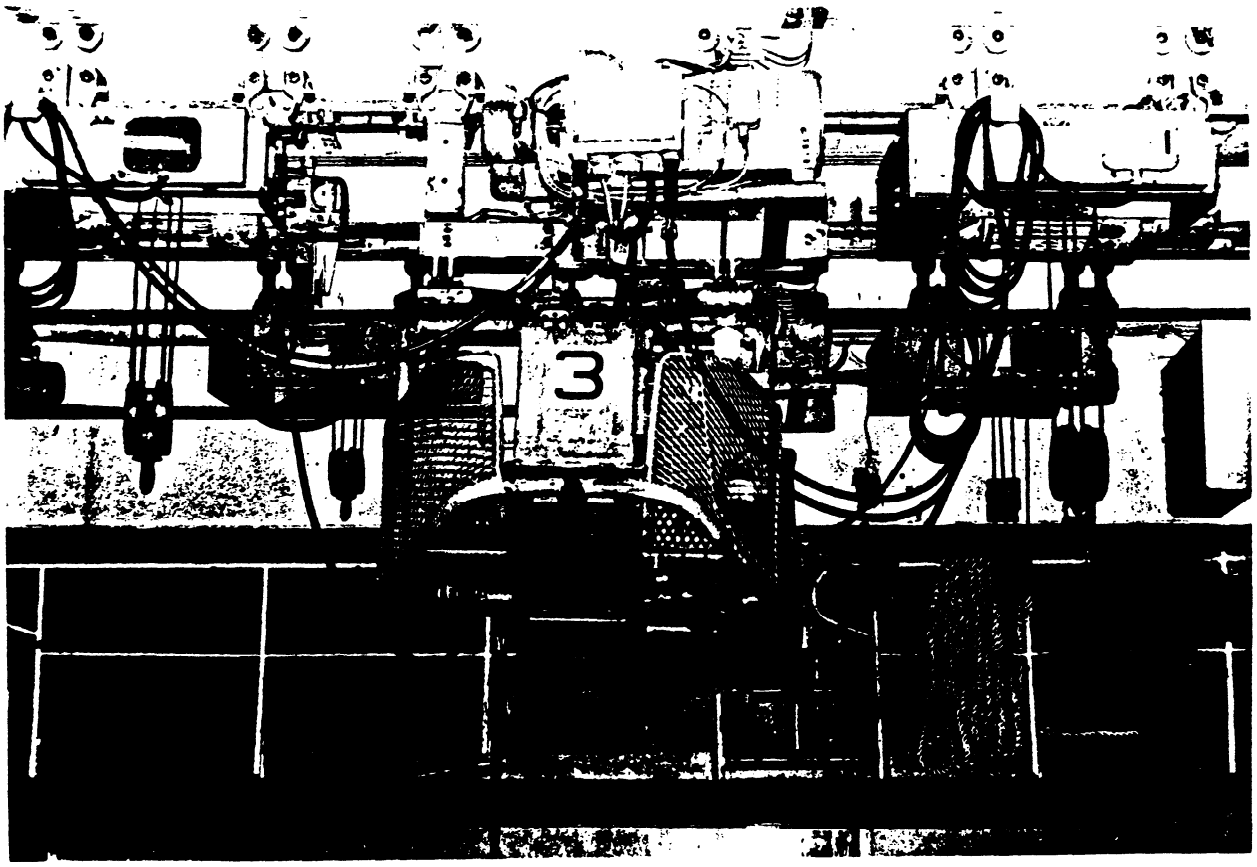
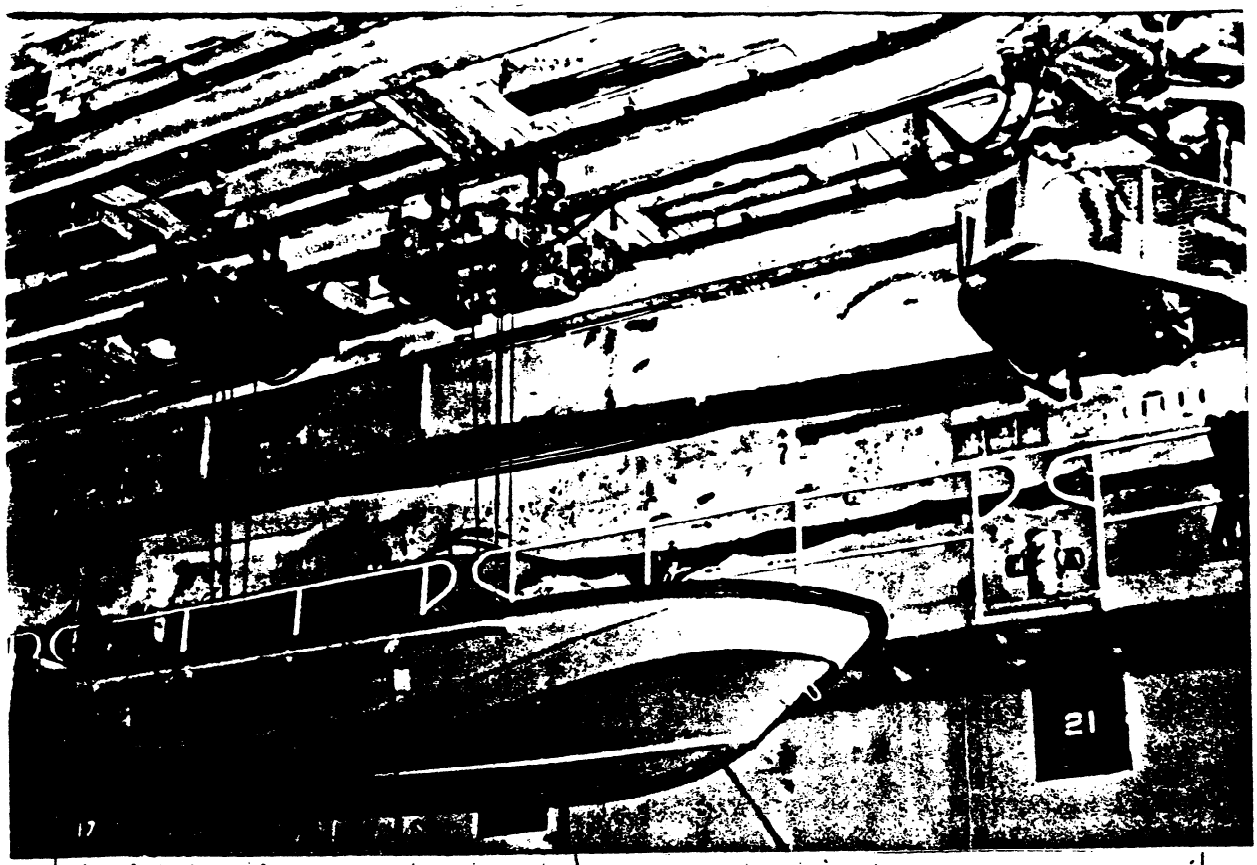


FIGURE 6. MONORAIL AS CURRENTLY CONFIGURED ON AN LPD

MONORAIL SUPPORT



DESIRED RELOCATION OF MONORAIL HOISTS

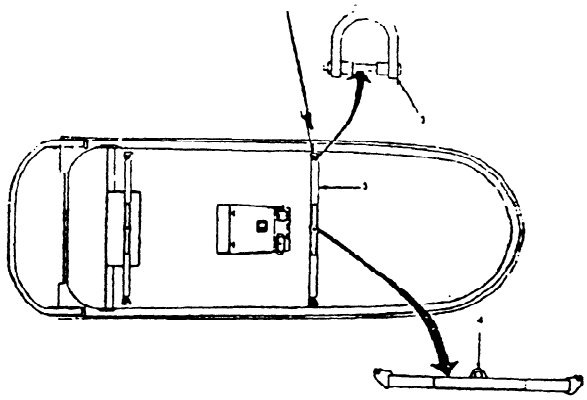


FIGURE 7. DESIRED RELOCATION OF MONORAIL HOISTS

MONORAIL SUPPORT

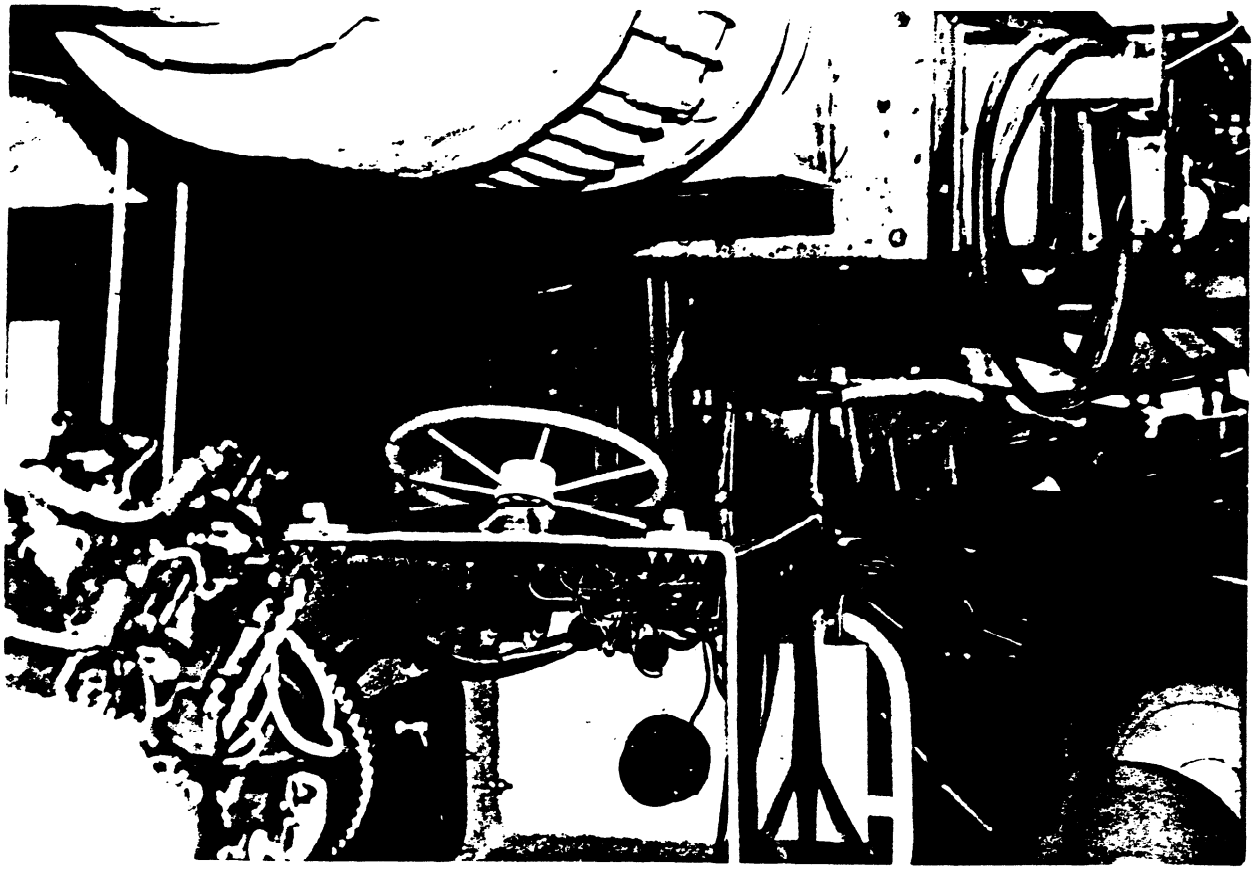


FIGURE 8. OVERHEAD CLEARANCE BETWEEN THE TOP RRC AND THE AND THE MONORAIL HOIST

MONORAIL SUPPORT

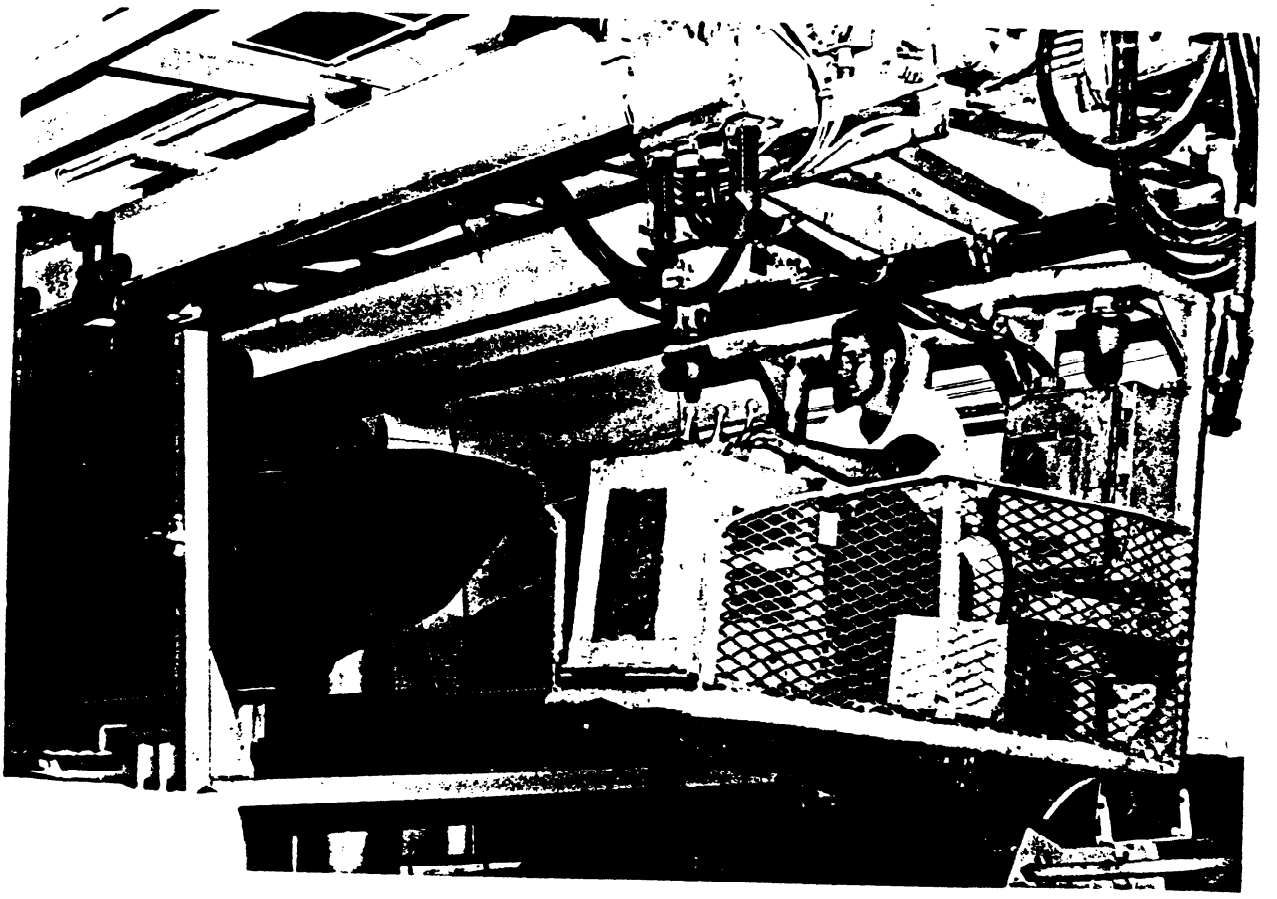


FIGURE 9. MODIFIED MONORAIL CONFIGURATION PREPARING TO LIFT RRC FROM TOP CRADLE

MONORAIL SUPPORT

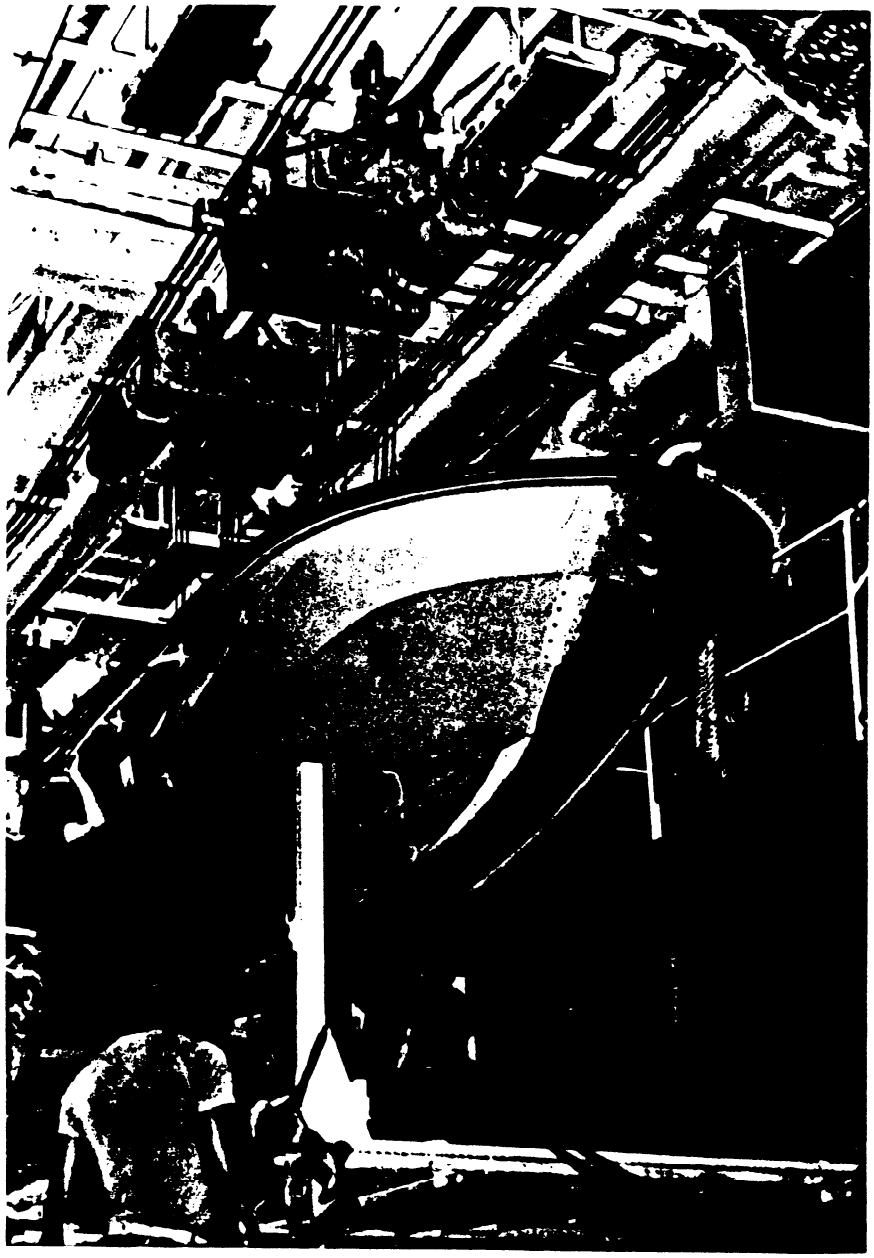


FIGURE 10. REMOVAL OF RRC FROM MIDDLE TIER OF CRADLES USING MODIFIED MONORAIL

STOWAGE SYSTEM

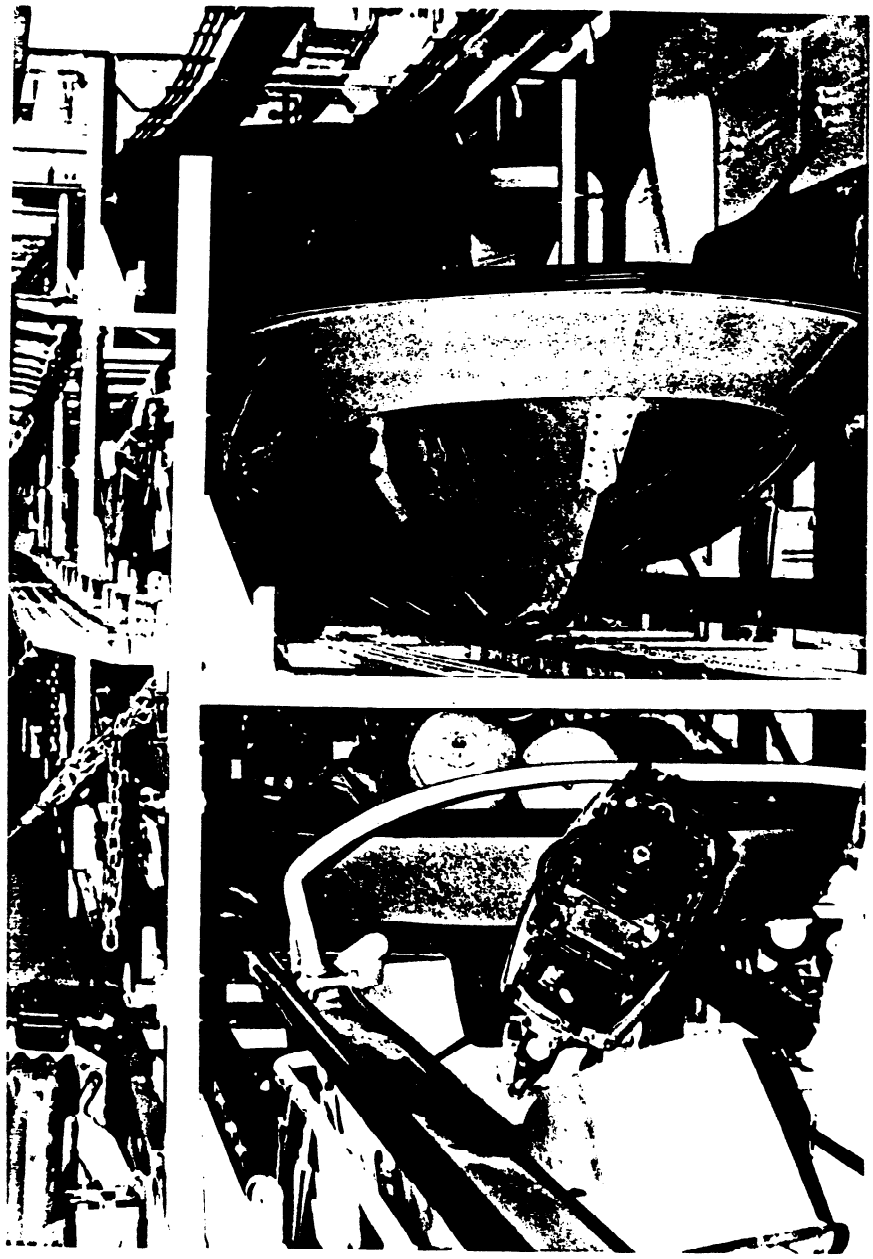


FIGURE 11. RRCs IN CRADLE

LAUNCH AND RECOVERY SYSTEM

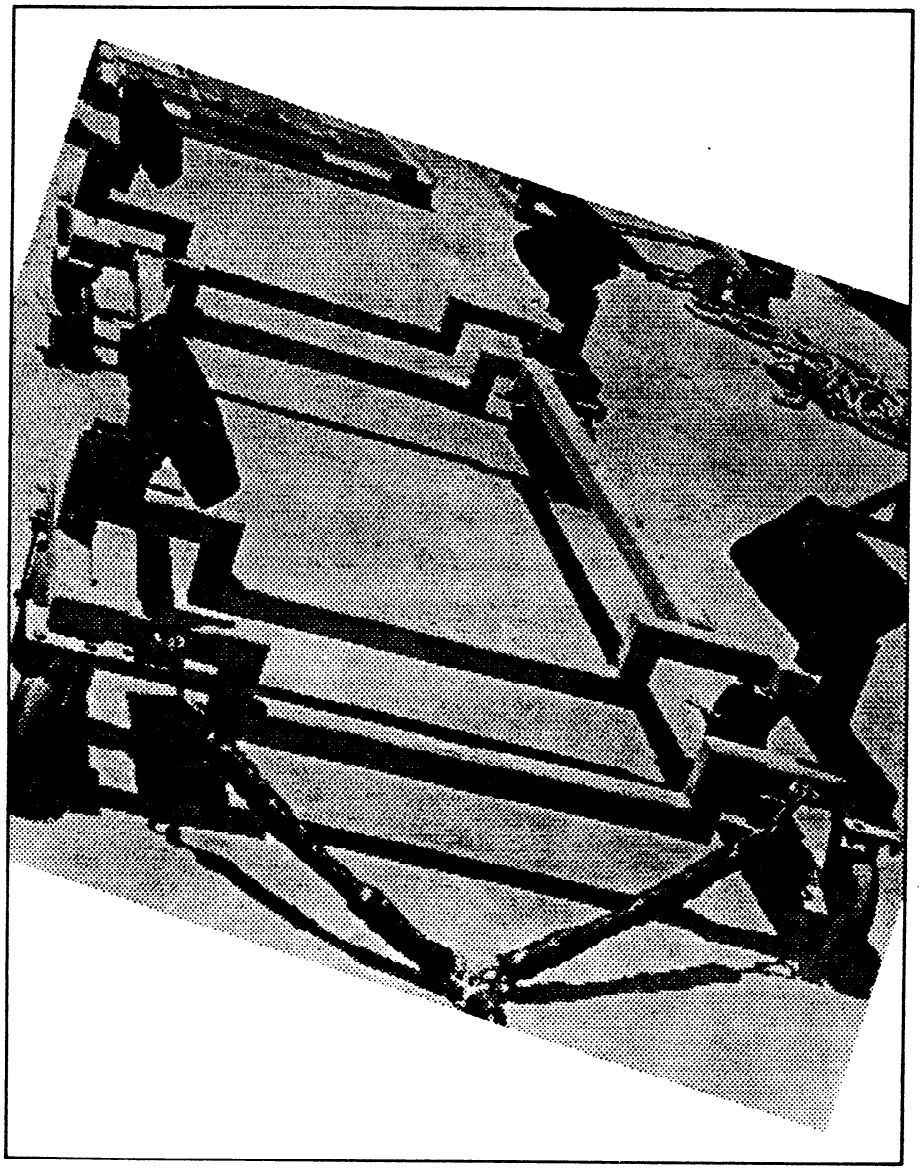


FIGURE 12. RRC DOLLY

LAUNCH AND RECOVERY SYSTEM

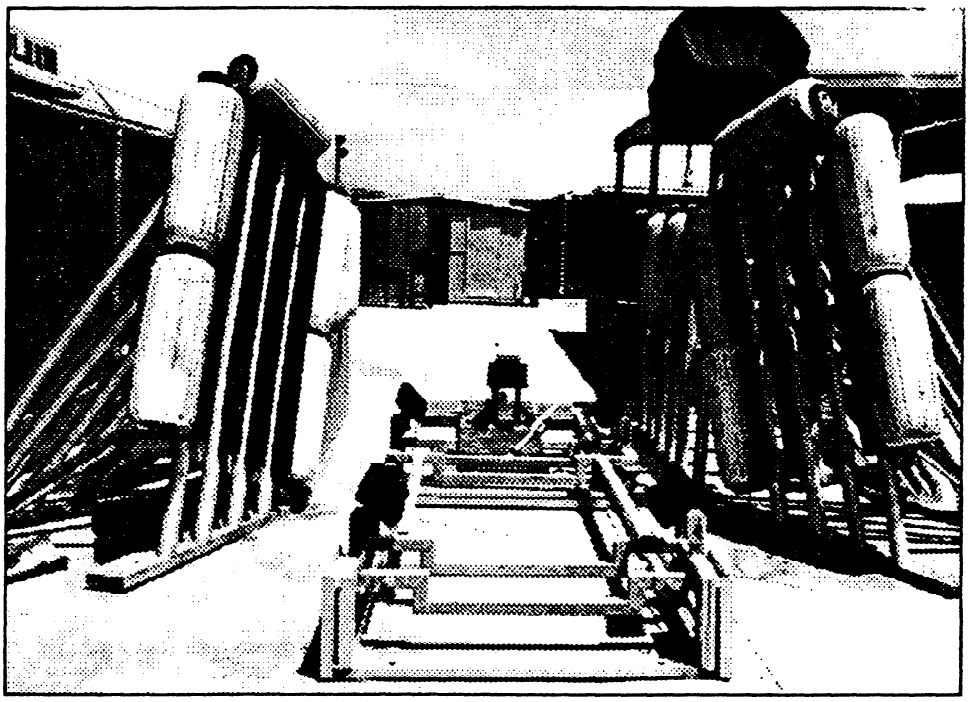


FIGURE 13. LAUNCH AND RECOVERY DEVICE (LRD)

LAUNCH AND RECOVERY SYSTEM

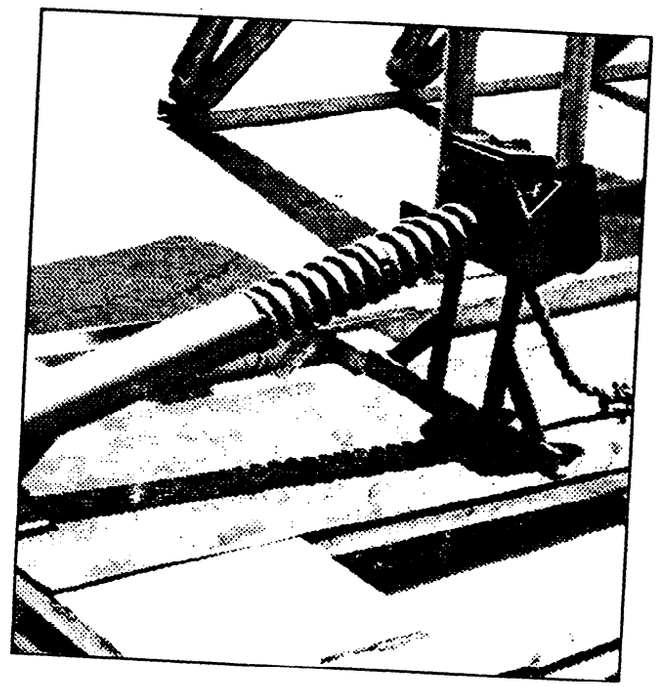


FIGURE 14. LRD BOAT POSITIONER

LAUNCH AND RECOVERY SYSTEM

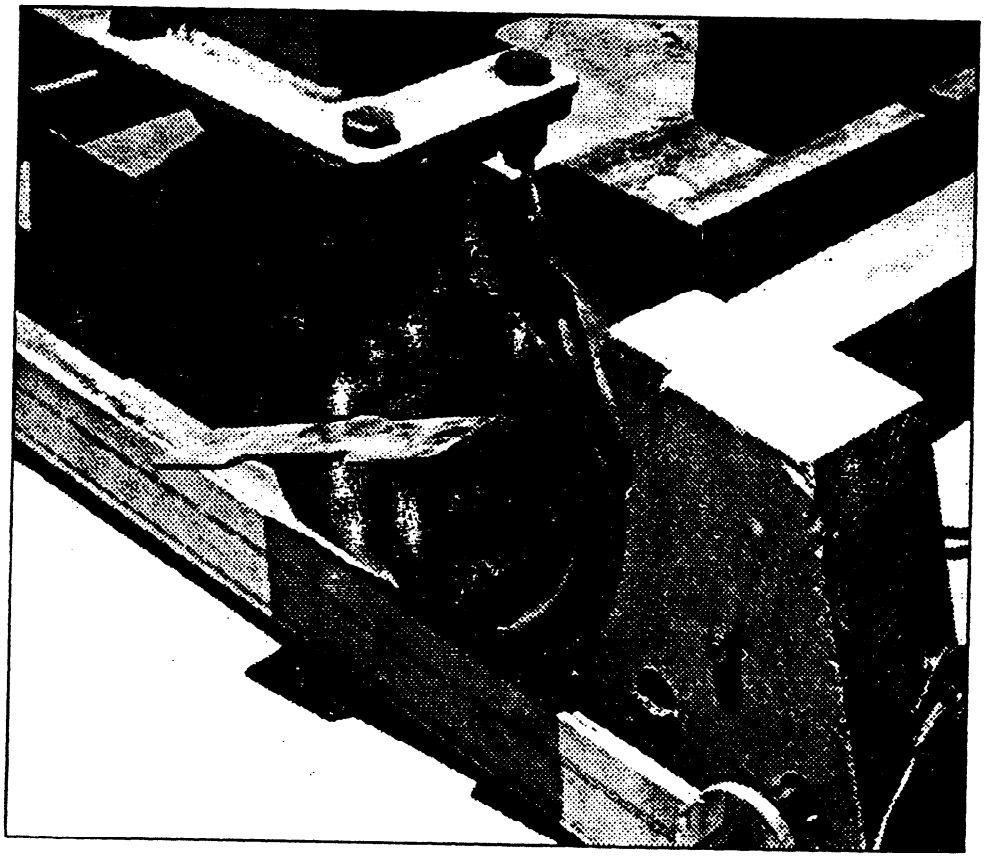


FIGURE 15. RRC DOLLY WHEEL CHOCK

LAUNCH AND RECOVERY SYSTEM

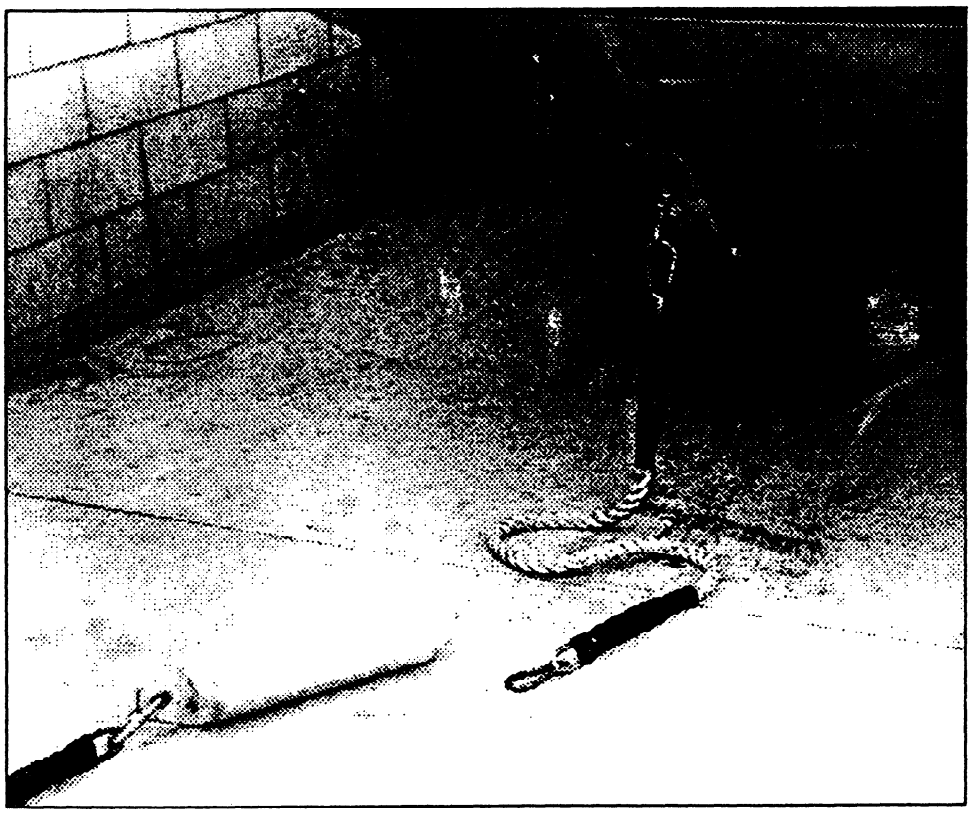


FIGURE 16. RECOVERY LINE WITH FLOAT AND RRC BOW LINE

LAUNCH AND RECOVERY SYSTEM

FIGURE 17. RECOVERY LIN ' CONNECTED TO RRC BOW LINE

LAUNCH AND RECOVERY SYSTEM

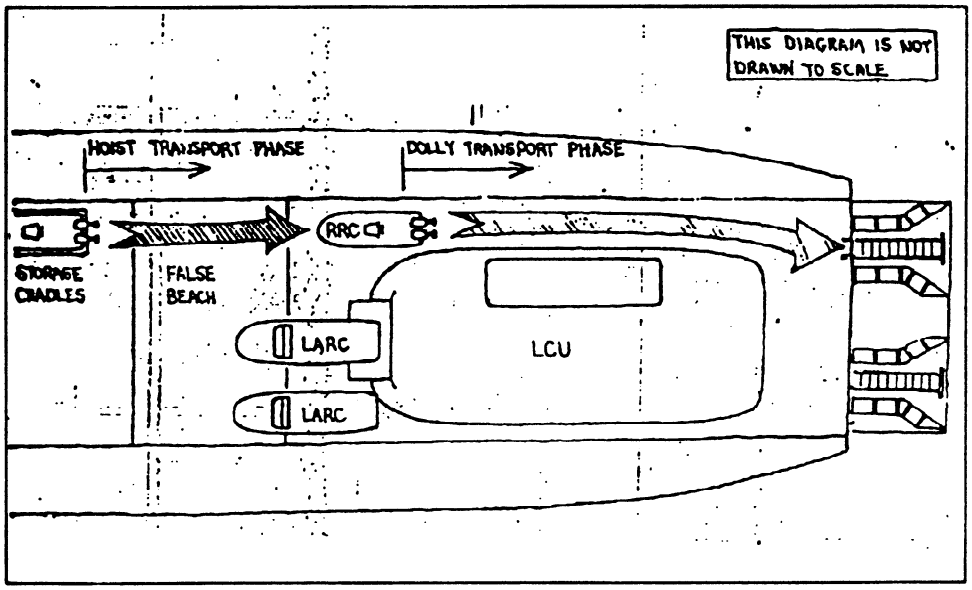


FIGURE 18. RRC DRY WELL LAUNCH AND RECOVERY SYSTEM

RRC AND ASSOCIATED EQUIPMENT DESCRIPTION

RRC PRE/POST OP CHECKLIST

DATE_____

PORT: HOURS OUT: _____ HOURS IN: _____

STARBOARD: HOURS OUT: _____ HOURS IN: _____

COXSWAIN: _____

ITEM NO.	PRE-OP	POST-OP	REMARKS
1. BATTERY			
2. LIGHT SWITCH			
3. THROTTLE SHIFT CONTROL			
4. TRIM/TILT			
5. KEY SWITCHES			
6. MTR ATTACHING BRACKET			
7. PROPELLERS			
8. HULL			
9. HULL FITTINGS/HDWARE			
10. GROUNDING SYSTEM			
11. CONSOLE			
12. COMPASS			
13. TRIM/TILT GAUGE			
14. TACHOMETER			
15. STEERING SYSTEM			
16. FUEL FILL CAP			
17. FUEL FILL VENT			
18. FUEL ACCESS COVER			
19. FUEL LINE AND PRIMER			
20. FUEL/WATER SEP.			
21. FUEL LEVEL GAUGE			
22. VRO TANK			
23. VRO LINES/PRIMER			
24. OIL LEVEL			
25. AUX EQUIP & TOOLS			
26. UNUSUAL NOISES			
27. FUEL/OIL LEAKS			

CHECK MARK = O.K.
L = LUBRICATE
S = SERVICE
V = VERIFY
X = ADJ/REPAIR REQUEST
O = DEFECT CORRECTED

APPENDIX B

DETAILED RIGID RAIDING CRAFT (RRC) LAUNCH AND RECOVERY PROCEDURES

1. The rigid raiding craft (RRC) launch and recovery procedures contained in this Appendix are interim guidelines for single and double RRC launch/recovery (L/R) operations.

a. The RRC LRD allows for dry well RRC operations from the LPD class ship without ballasting down and emptying the well deck load.

b. Launch of RRCs using the LRD will be under the supervision of the ship's first lieutenant and the well deck control officer (WDCO). RRC L/R teams will be tailored to fit the situation and will normally be manned by a combination of Navy and Marine (ship's platoon) personnel. L/R Opns will be conducted in a fashion similar to flight deck operations, in accordance with the instructions of the ship. The minimum personnel needed are as follows:

(1) WDCO, safety officer, safety petty officer, monorail operator, stern gate operator, phone talker and signalman.

(2) L/R OIC, L/R SNCOIC/POIC, rope team NCOIC/POIC, line handler teams (12 pers per LRD), coxswain (1 per RRC) and assistant coxswain (1 per RRC).

NOTE: Coxswains and assistant coxswains shall be trained as specified in small boat coxswain's course developed by CG LFTCPAC.

2. **DRY WELL LAUNCH**

a. Preparation for Single RRC/LRD Launch

(1) RRC L/R OIC will coordinate RRC operations with ship's first lieutenant and WDCO.

(2) All personnel involved in RRC launch operations will receive joint pre-launch brief to include safety instructions by RRC L/R OIC and WDCO, to include but not limited to:

(a) Concept of launch operations.

(b) Launch procedures.

(c) Safety

1 Possibility of falling overboard

2 Use of safety harness and tending lines (two line tenders to each harness) and flotation devices.

3 Line handling: line tending, pulling and securing techniques.

(3) Individual safety equipment will be donned to include lifelines for personnel heaving recovery line floats.

(4) The LR OIC and WDCO shall conduct a safety equipment inspection to ensure all L/R equipment is pre-staged, serviceable and that all individual safety equipment is properly donned.

(5) The WDCO shall coordinate with the bridge to lower the stern gate to a position slightly above horizontal (85 degrees) to facilitate LRD rigging.

(6) WDCO will signal RRC L/R OIC to:

(a) Rig and derig stern gate stanchion and lifelines.

1 Rig prior to LRD assembly.

2 Derig prior to conducting RRC operations.

3 Rig prior to LRD disassembly.

4 Derig prior to closing stern gate.

(b) Attach LRD to starboard side of stern gate. RRC L/R OIC shall supervise LRD assembly and attachment to stern gate. RRC L/R OIC shall ensure all LRD components and accessories are serviceable and that LRD is firmly attached to stern gate. Upon satisfactory inspection of LRD and attachment to starboard side of stern gate, RRC L/R OIC will make status report to WDCO.

(7) The coxswain/assistant coxswain shall conduct the following prelaunch checks:

(a) Erect coxswain platform and Sampson post. This step may be accomplished when the RRC is moved to the middle or lower open cradle prior to hoisting.

(b) If required for peace time night launch and recovery operations, use six chemlites for navigational lighting. They should be attached with rubber bands to three points on the craft (two chemlites per point) as follows: 2-white centered on the crash rail located astern of the engines; 2-red on the forward one-third of the port side grab rail; and 2-green on the forward one-third of the starboard side grab rail. The port and starboard chemlites will be rigged in such a manner that each set of lights will not be visible from the opposite side.

(c) Place fresh/salt water hoses, with special manufactured adapters, over the water intake ports of the RRC's engines and test run engines. This will increase reliability of engine starting during launch. Recommend two hose teams, one on

each side of the well deck, with hose handlers and coxswains assigned. Engine tests should start once the first RRC is placed in the dolly and continue during the handling/staging evolution until all engines have been tested.

(d) RRCs determined to be non-operational shall be replaced by operational RRCs from the cradle.

(8) The RRC raid force shall be staged by boat teams in an area designated by the ship. The raid force commander shall conduct a final equipment check and personnel inspection. The raid force commander shall notify the L/R OIC and WDCO when inspections have been completed.

(9) Upon completion of LRD assembly, RRCs on dollies shall be staged on centerline, 20-feet from the stern gate sill (if possible). Prior to positioning the dolly in the tracks, the rope team POIC shall inspect the dolly to ensure dolly wheels are secured in the linear position and that hinges are locked.

(10) WDCO shall obtain "Green Well" for launch from well deck control (this condition permits well deck personnel to raise/lower the stern gate as required).

(11) Prior to scheduled launch time, WDCO shall direct that the RRC be positioned (stern of RRC facing aft) in the LRD by the rope team with dolly chocks installed.

(12) The L/R OIC shall verify that the RRC is properly positioned in the LRD track.

(13) Upon verification of RRC/LRD placement, WDCO shall order the boat team to board RRC. Boat teams shall board over the RRC's bow.

(14) Once the RRC is boarded and embarked troops are secure, the rope team shall grasp the dolly tow line.

b. RRC Pre-Staging

(1) Empty well deck. Pre-stage all RRCs on dollies in the well deck, 20-feet from the stern gate sill.

(2) With one LCU in the well deck, 14 RRCs can be stage in the well.

c. RRC/LRD Launch Execution

(1) Upon receiving command to launch RRCs from bridge, WDCO will lower stern gate until RRC engine propellers are submerged. RRC L/R OIC will notify the WDCO when engines are submerged. The stern gate will remain in this position until receiving a thumbs-up from the coxswain indicating that both engines are running. The stern gate shall then be lowered to the stops and the RRC may retract whenever there is sufficient water.

(2) When the L/R OIC has notified the WDCO that the RRC is clear, the stern gate shall then be raised to a horizontal position.

(3) Once the stern gate is in a horizontal position, the rope team POIC shall remove the dolly chocks and the dolly from the LRD. The launch cycle stated above will be repeated until all RRCs are launched.

(4) Once all RRCs are launched, the WDCO shall inform the bridge. The L/R OIC shall inspect the LRD for damage.

NOTE: Launch procedures outlined above are for single LRD. Tandem RRC launches may be conducted utilizing two LRDs and two rope teams.

d. Preparation for Single RRC/LRD Recovery

(1) WDCO shall open the stern gate to a horizontal position when instructed by bridge to prepare for RRC recovery.

(2) The L/R OIC shall inspect the LRD attachments to the stern gate and report LRD status to the WDCO.

(3) The L/R OIC shall direct the rope team POIC to stage a recovery dolly onto the LRD and insert dolly chocks. Two tow lines shall be attached to the recovery dolly. Remaining dollies may be prestaged to conserve space.

(4) The rope team POIC shall ensure recovery boat stop is attached to the dolly tracks and that the recovery line is attached with line float at seaward end. The rope team POIC shall ensure that the recovery line runs through the center of the boat stop.

(5) For night operations, chemical lights shall be mounted on LRD aft upper end wall sections and on the recovery float. A green light shall be mounted on the starboard LRD aft wall and a red light shall be mounted on port LRD aft wall.

(6) Recovery personnel shall muster at their recovery stations. The L/R OIC shall conduct an inspection to ensure individual safety equipment is properly donned. Once the inspection has been completed, the L/R OIC shall report readiness to recover RRCs to the WDCO.

e. RRC/LRD Recovery Execution

(1) The RRC shall approach the stern gate when signaled by a green light or flag (red means stop). The WDCO shall direct the L/R OIC to heave the recovery line and float. Recovery line handlers shall be at least three feet from the forward edge of the stern gate when heaving the recovery line and float.

(2) Once the recovery line and float is thrown astern and the stern gate is clear, WDCO will lower the stern gate to an optimum angle for recovery. The stern gate angle shall be determined by the sea state, RRC load (draft) and the sill level.

(3) The rope team shall grasp the recovery line while the #1 man, aboard the RRC, picks up the float/line from the water with a boat hook, disconnects the float and attaches the snap hook to the eyelet of the RRC bow line.

(4) The RRC shall approach the LRD under power until the RRCs bow crosses the stern gate. The coxswain will take his signals only from the well deck NCOIC/POIC at this time regarding whether he should continue the approach or wave off. The rope team NCOIC shall ensure that the recovery line remains taut throughout the RRC approach.

(5) Once the RRC bow crosses the stern gate edge, the coxswain shall place his engines in neutral.

(6) Once the RRC engines are in a raised position, the rope team will pull the RRC into the impact ramp of the LRD until the forward movement stops. The evolution is completed when the boat positioner is in direct contact with the RRC.

(7) The rope team shall hold the line taut (portable cleats can be used to assist) until the rope team NCOIC has notified the L/R OIC and WDCO that the RRC has been recovered.

(8) Once the RRC has been recovered, WDCO shall raise the stern gate to 85 degrees (05 degrees above horizontal). As the stern gate raises the boat from the water, the coxswain shall secure and raise his engines.

(9) After the stern gate has been raised, WDCO shall direct the L/R OIC to have the rope team disconnect recovery lines from the RRC bow line. The rope team shall disconnect the dolly chocks/boat stop and pull the dolly mounted RRC off of the LRD track and into the well deck.

(10) Once in the well deck, the boat team shall disembark over the RRC's bow. After the boat team has disembarked, the boat team leader shall take a muster, stow all gear and move boat team out of the well deck. The boat leader shall report the muster results to the CCO. When the RRC is clear of embarked troops, the coxswain and assistant coxswain shall disembark the RRC and assist the rope team in moving the RRC to a designated well deck staging area.

(11) WDCO shall lower the stern gate to a horizontal position (90 degrees) and WDCO shall direct the L/R OIC to have rope team prepare the next recovery dolly on the LRD.

(12) WDCO shall inform the bridge when all RRCs have been recovered and again when the LRD is disassembled and all L/R equipment is stowed/secured for sea.

(13) Once the stern gate has been prepared for LRD disassembly, the WDCO shall direct the L/R OIC to disassemble and stow the LRD and all L/R equipment.

(14) Upon completion of L/R operations, the L/R OIC and WDCO shall debrief all well deck personnel.

NOTE: Recovery procedures listed above are for a single LRD. RRC recoveries may be conducted utilizing two LRDs, two rope teams and two portable cleats.

f. Recovery of Disabled RRCs

(1) Marry up a disabled RRC alongside a recovery craft and tow to a position aft of the stern gate.

NOTE: Do not tow RRC astern of recovery craft.

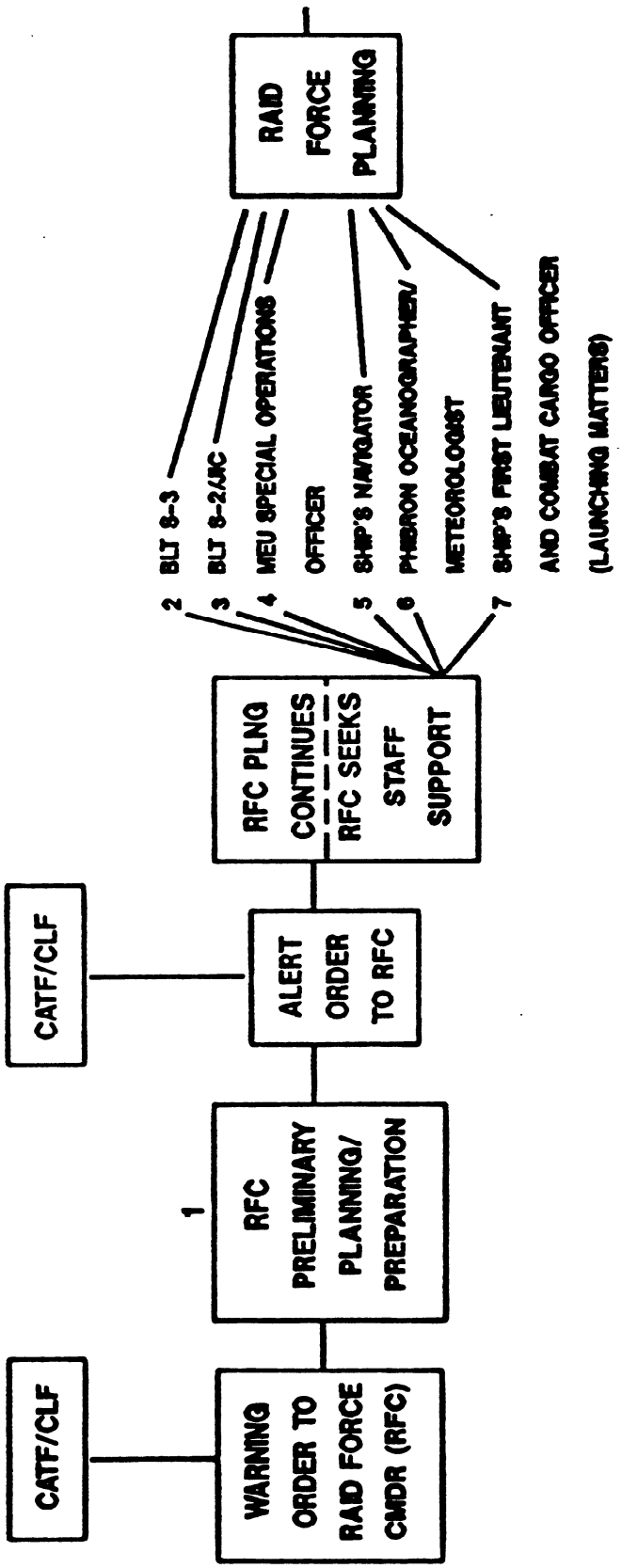
(2) Upon reaching the stern gate, the disabled RRC should be recovered utilizing normal recovery procedures.

(3) After hook-up of the recovery craft to the disabled RRC, the recovery craft should then cast off only after ensuring that the disabled craft is under positive control of the well deck crew. The recovery craft shall standby until the disabled RRC is fully recovered.

NOTE: Personnel going to the edge of the stern gate to throw the recovery line with float to an approaching RRC shall wear a safety harness, which is tethered to the ship.

APPENDIX C

PLANNING FOR RAIDING CRAFT TRANSIT AND RETURN



PLANNING FOR RAIDING CRAFT TRANSIT AND RETURN (CONT'D)

1. PRELIMINARY PLAN/PREPARATION

A. ANALYZE MAPS/CHARTS OF OBJECTIVE AND WATERS VICINITY OF OBJECTIVE, S-2

B. ENEMY SITUATION, S-2

C. REQUEST RECONNAISSANCE OF OBJECTIVE BY MARINE RECON/SEAL ASSETS, HYDROGRAPHIC RECON AND SUROB, S-2

D. DETERMINE TYPE OF BOAT TO BE USED ASAP

E. PREPARE WEAPONS, BOATS AND EQUIPMENT

PLANNING FOR RAIDING CRAFT TRANSIT AND RETURN (CONT'D)

2. BLT S-3

A. TRAINING AREA REGS/MANUALS DEALING WITH NAVIGATION

B. AFTER ACTION REPORTS FROM LIAISON VISITS TO THE LOCAL AREA

C. REQUEST ADVICE OF ALLIED NAVAL LIAISON OFFICERS ATTACHED TO PHIBRON THAT ARE FAMILIAR WITH LOCAL AREA

D. REQUEST LOCAL/EXPERIENCED GUIDE FOR TRANSIT

E. INQUIRE INTO SCHEDULED BLT/SHIP/MEU/PHIBRON PLANNING CONFERENCES

F. AIR SUPPORT FOR POSSIBLE ALTERNATE MEANS OF WITHDRAWAL/MEDEVAC/FIRE SUPPORT

PLANNING FOR RAIDING CRAFT TRANSIT AND RETURN

(CONT'D)

3. BLT S-2/JIC

A. ENEMY SITUATION (ENEMY ORDER OF BATTLE & DETECTION/CLASSIFICATION CAPABILITIES - SONAR/RADAR/FLIR/ETC)

B. METEOROLOGICAL AND TIDAL DATA

C. ADDITIONAL LOCAL NAVIGATION CHARTS (IN ADDITION TO DMA ISSUE)

D. REQUEST HYDROGRAPHIC RECONNAISSANCE/SUROB OF BLS AND/OR ESTURARY, HARBOR ENTRANCE TO BE TRANSMITTED IF NOT ALREADY COMPLETED

E. REQUEST LOCAL/EXPERIENCED GUIDE FOR TRANSIT

F. REQUEST ANY OTHER MANUALS HELPFUL TO NAVIGATION IN THE LOCAL AREA IN ADDITION TO SAILING DIRECTIONS AND SUMMARY OF CORRECTIONS

G. REQUEST ADVICE OF ALLIED NAVAL LIAISON OFFICERS ATTACHED TO PHIBRON THAT ARE FAMILIAR WITH THE AREA

H. RECONNAISSANCE REPORTS ON FILE OF THE BLS AND/OR ESTUARIES, HARBOR ENTRANCES TO BE TRAMSMITTED

I. PHOTOGRAPHS, SATELLITE IMAGERY OF THE BLS AND/OR ESTUARIES, HARBOR ENTRANCES TO BE TRANSMITTED

J. REQUEST RPV SUPPORT

PLANNING FOR RAIDING CRAFT TRANSIT AND RETURN (CONT'D)

4. MEU SPECIAL OPERATIONS OFFICER (AS REQUIRED)

A. COORDINATION W/ARG/MEU ASSETS FOR INFORMATION/INTELLIGENCE REQUIREMENTS (SEALS/RECONNAISSANCE UNITS/BMU)

B. COORDINATION FOR ADVANCE FORCE OPERATIONS

C. TRAINING AREA REGS/MANUALS DEALING WITH NAVIGATION

D. AFTER ACTION REPORTS FROM LIAISON VISITS TO THE LOCAL AREA

E. REQUEST ADVICE OF ALLIED NAVAL LIAISON OFFICERS ATTACHED TO PHIBRON THAT ARE FAMILIAR WITH LOCAL AREA

F. REQUEST LOCAL/EXPERIENCED GUIDE FOR TRANSIT

G. INQUIRE INTO NAVIGATION RELATED INFORMATION PASSED AT MEU/PHIBRON PLANNING CONFERENCES

H. AIR SUPPORT FOR POSSIBLE ALTERNATE MEANS OF WITHDRAWAL/MEDEVAC/FIRE SUPPORT

I. GENERAL ASSISTANCE IN PLANNING LAUNCH/RECOVERY, TRANSIT, AND LANDING/WITHDRAWAL

J. LIAISON BETWEEN RAID COMPANY COMMANDER AND MEU COMMANDER

PLANNING FOR RAIDING CRAFT TRANSIT AND RETURN (CONT'D)

5. SHIPS NAVIGATOR

A. METEOROLOGICAL AND TIDAL DATA

B. ADDITIONAL LOCAL NAVIGATION CHARTS (IN ADDITION TO DMA ISSUE)

C. ANY OTHER NAVIGATION MANUALS IN ADDITION TO SAILING DIRECTIONS AND SUMMARY OF CORRECTIONS

D. ANY NAVIGATION ADVICE HE MAY BE ABLE TO LEND, DEVELOP PLAN (NAV TRACK) WITH HIM

PLANNING FOR RAIDING CRAFT TRANSIT AND RETURN (CONT'D)

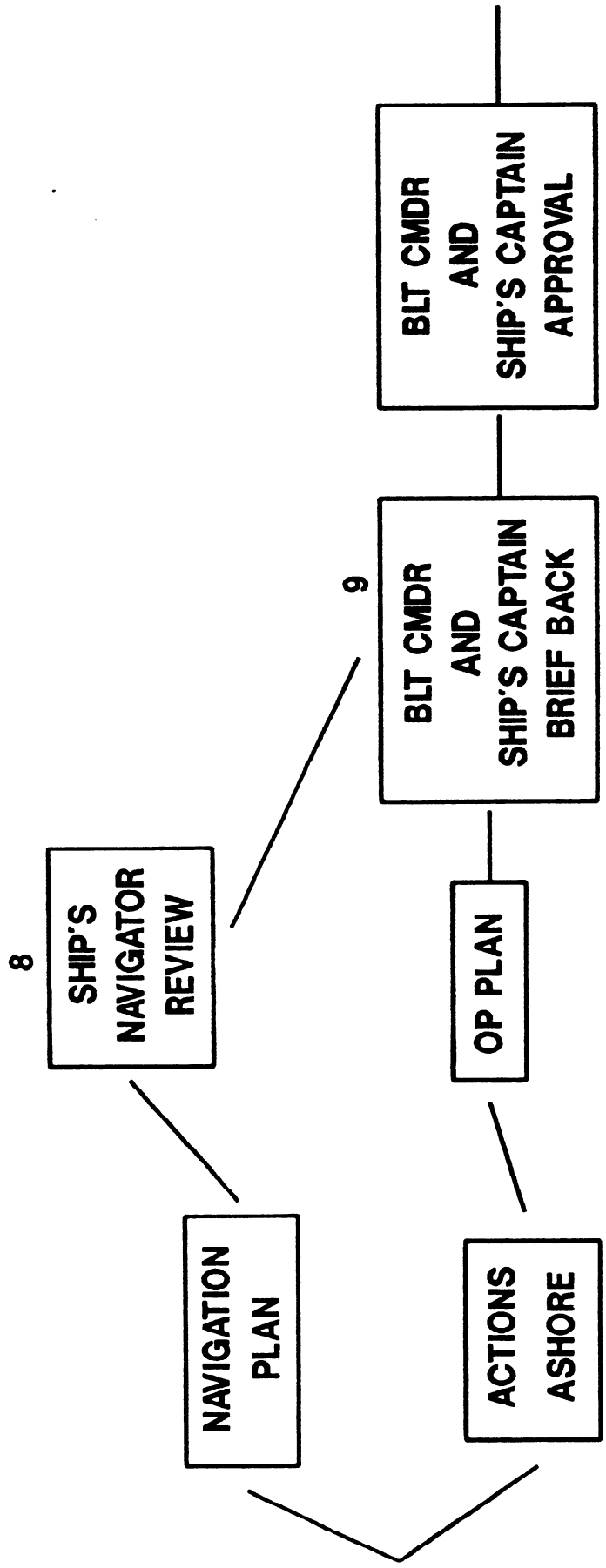
6. PHIBRON OCEANOGRAPHER/METEOROLOGIST

A. DETAILED OCEANOGRAPHIC AND METEOROLOGICAL DATA

B. DISCUSS INTENDED NAVIGATION TRACK TO BLS AND RETURN DETERMINE POTENTIAL OBSTACLES ALONG ROUTE

PLANNING FOR RAIDING CRAFT TRANSIT AND RETURN

(CONT'D)



PLANNING FOR RAIDING CRAFT TRANSIT AND RETURN (CONT'D)

8. SHIPS NAVIGATOR

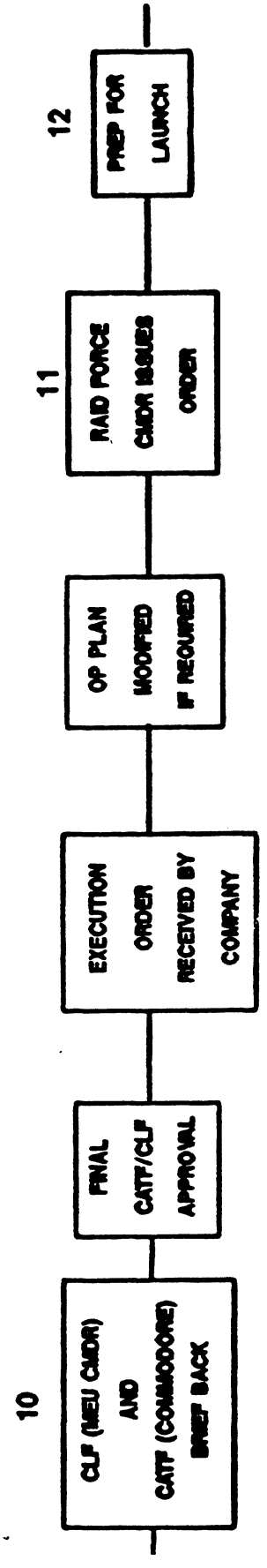
A. THOROUGH BRIEF OF NAVIGATION PLAN FROM SHIP OR ITV TO BLS AND FROM BLS TO RENDEZVOUS SITE AND ALTERNATE RENDEZVOUS SITE (BRING CHART WITH PLOTTED COURSE)

B. MODIFY NAVIGATION PLAN, IF NECESSARY BASED ON HIS RECOMMENDATIONS

9. THOROUGH BRIEF OF ENTIRE PLAN FOR BLT CMDR, SHIP'S CAPTAIN AND DESIGNATED STAFF OFFICERS

PLANNING FOR RAIDING CRAFT TRANSIT AND RETURN

(CONT'D)



PLANNING FOR RAIDING CRAFT TRANSIT AND RETURN (CONT'D)

10. THOROUGH BRIEF OF ENTIRE PLAN FOR CLF, CATF, AND DESIGNATED STAFF OFFICERS

11. RAID ORDER

    A. COXSWAIN BRIEF

    B. RFC INSPECTION

    C. RFC REHEARSALS

12. PREPARATION

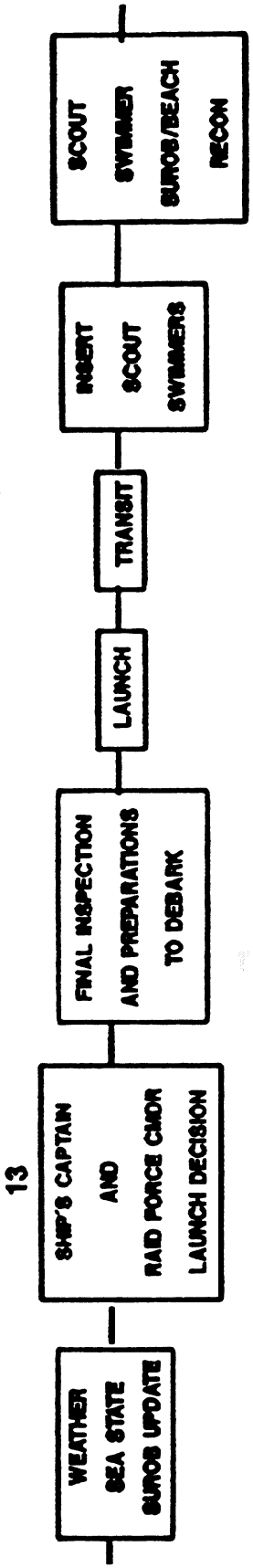
    A. FINAL BOAT PREP

    B. PREP LRD/WELL DECK

    C. COORDINATE WITH SHIP'S 1ST LT/CCO

PLANNING FOR RAIDING CRAFT TRANSIT AND RETURN

(CONT'D)



13

PLANNING FOR RAIDING CRAFT TRANSIT AND RETURN (CONT'D)

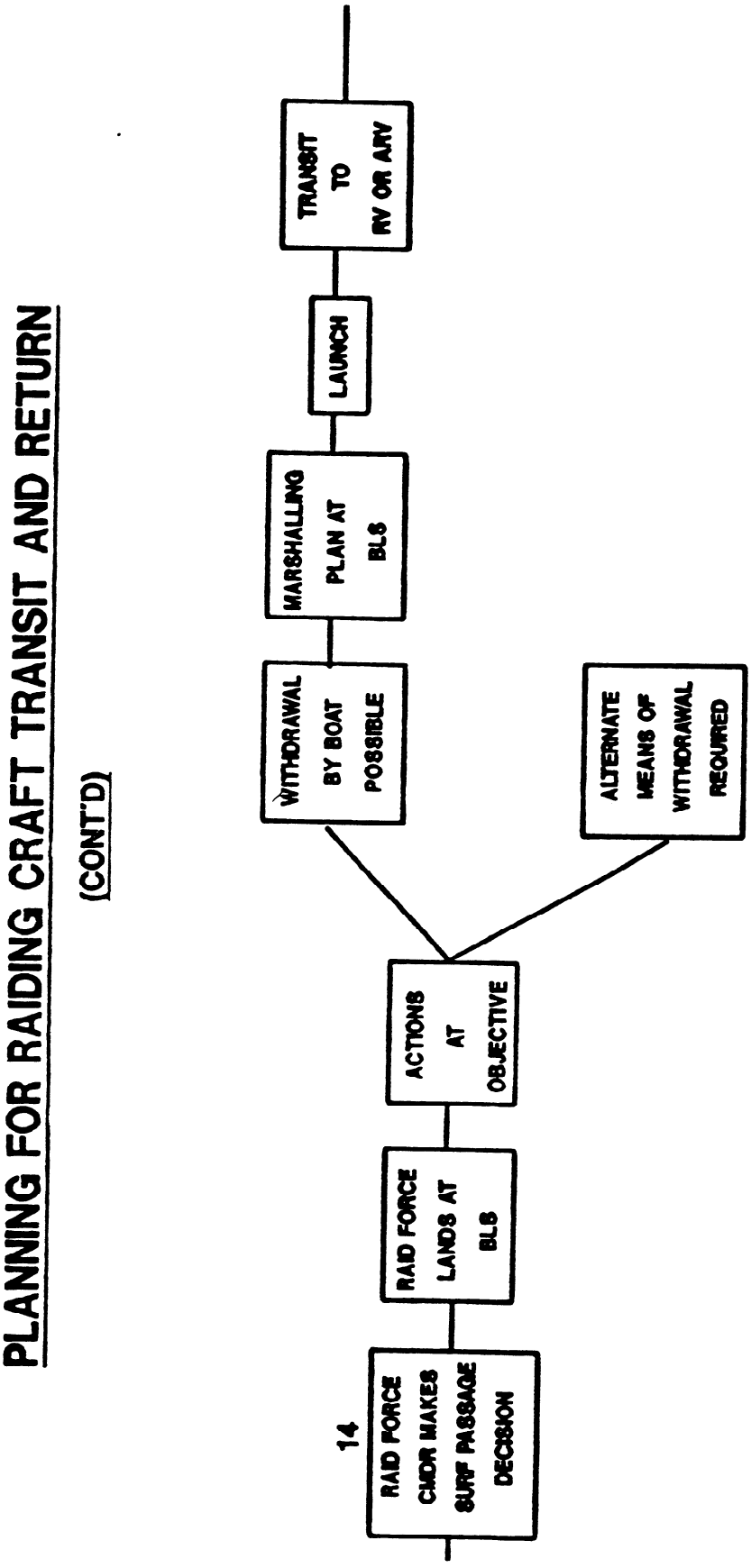
13. GO/NOGO DECISION

A. JOINT DECISION, HOWEVER SHIP'S CAPTAIN HAS FINAL AUTHORITY

B. BASED ON SHIP CAPTAIN'S JUDGEMENT, RAID FORCE CMDR JUDGEMENT, WEATHER/SEA STATE/ SUROB UPDATE, AND ALL RAID FORCE PLANNING CHECKLIST CRITERION BEING MET

PLANNING FOR RAIDING CRAFT TRANSIT AND RETURN

(CONT'D)



PLANNING FOR RAIDING CRAFT TRANSIT AND RETURN (CONT'D)

14. GO/NOGO DECISION

UPON "GO" SIGNAL BY CHIEF SCOUT SWIMMER, BASED ON FAVORABLE SCOUT SWIMMER RECON (ENEMY SITUATION, CORRECT BLS, BEACH RECON, SUROB, OBSTACLES)

APPENDIX D

STANDARD OPERATING PROCEDURES FOR RAIDING CRAFT

OPERATIONAL PLANNING CHECKLIST FOR RRC/CRRC AMPHIBIOUS RAID

1. **SEA STATE**

ANTICIPATED _____

SIX HOURS PRIOR TO LAUNCH _____

FOUR HOURS PRIOR TO LAUNCH _____

TWO HOURS PRIOR TO LAUNCH _____

ONE HOUR PRIOR TO LAUNCH _____

2. **WEATHER CONDITIONS**

A. WINDS	DIRECTION	VELOCITY
SIX HOURS PRIOR TO LAUNCH	_____	_____KNOTS
FOUR HOURS PRIOR TO LAUNCH	_____	_____KNOTS
TWO HOURS PRIOR TO LAUNCH	_____	_____KNOTS
ONE HOUR PRIOR TO LAUNCH	_____	_____KNOTS
LAUNCH TIME	_____	_____KNOTS

B. VISIBILITY FACTORS _____

_____

C. PERCENT ILLUMINATION _____

3. **TIDAL CONDITIONS**

A. TIMES LOW _____

HIGH _____

LOW _____

HIGH _____

B. RANGE _____ KNOTS

C. BLS CONDITIONS AT LANDING TIME: EBBING - FLOODING - SLACK WATER

4. **SURF CONDITIONS**

A. BEACH GRADIENT GENTLE - MODERATE - STEEP

COMPOSITION _____

B. SURFCST/SUROB

ALPHA: SIGNIFICANT BREAKER HEIGHT _____

BRAVO: MAX BREAKER HEIGHT _____

CHARLIE: PERIOD _____

DELTA: TYPE _____

ECHO: ANGLE _____

FOXTROT: LITTORAL CURRENT _____

GOLF: SURF ZONE (# BREAKERS/WIDTH) _____

HOTEL: REMARKS _____

C. SUROB COLLECTION: DTG _____

AGENCY _____

5. **CHART STUDY**

A. OCEANOGRAPHIC CHARACTERISTICS _____

_____

B. OBSTACLES BETWEEN IP AND BLS _____

_____

C. ESTUARIES, RIVER MOUTHS, ISLANDS, OTHER GEOGRAPHIC FEATURES AND THEIR AFFECT ON THE BLS _____

_____

_____

D. DANGEROUS MARINE LIFE _____

_____

E. ROUTE/TIME INFORMATION LAT LONG

(1) POSITION

(A) INSERT POINT (IP) _____ _____

(B) BOAT LANDING SITE (BLS) _____ _____

(C) RENDEZVOUS (RV) _____ _____

(2) INFILTRATION ROUTE (IP TO BLS)

COURSE	SPEED	TIME
_____	_____	_____

(3) EXFILTRATION (BLS TO RV)

COURSE	SPEED	TIME
_____	_____	_____

F. NAVIGATION AIDS

(1) LIGHTS _____

_____

(2) BUOYS _____

_____

(3) TERRAIN FEATURES _____

_____

6. **COMM PLAN**

	FREQUENCY	CALLSIGN
LAUNCH VESSEL	_____	_____
INTERMEDIATE VESSEL	_____	_____
BEACH SAFETY	_____	_____
SAFETY BOAT	_____	_____
CO/RAID FORCE TAC	_____	_____

7. **ENEMY SITUATION**

A. STRENGTH AND DISPOSITION _____

_____

B. DETECTION CAPABILITIES

(1) SURFACE SEARCH RADAR

SURFACE _____

AIRBORNE _____

(2) INFRARED _____

(3) ACOUSTIC _____

(4) AMBIENT LIGHT _____

(5) THERMAL IMAGERY _____

(6) LPs/OPs _____

(7) PATROLLING _____

C. REINFORCEMENT CAPABILITIES _____

_____

8. **ADVANCE OPERATIONS**

A. USN SEAL DET _____

B. USMC RECON UNITS _____

C. OTHER INTEL ASSETS (SATELLITE IMAGERY, RPVs, ETC.) _____

_____

9. **CONTINGENCY PLANS**

A. BUMP PLAN(S) _____

_____

B. EMERGENCY REINFORCEMENT _____

_____

C. EMERGENCY EXTRACTION _____

_____

D. FIRE SUPPORT _____

_____

E. EMERGENCY MEDEVAC

(1) SHIP-TO-SHORE _____

_____

(2) ON-SHORE _____

_____

APPENDIX E

MEU(SOC) RAID FORCE SURF PASSAGE CRITERIA

1. **Purpose**. The information in this Appendix is intended to guide commanders in determining the GO/NO-GO criteria for surf passages by MEU(SOC) raid forces utilizing raiding craft.

2. **Discussion**. The Joint Surf Manual (JSM) provides the best short explanation of "surf sense" available. It should be studied by all commanders, staff and companies involved in MEU(SOC) raids. The JSM's most beneficial aid to amphibious planners is the Modified Surf Index (MSI); and, the Modified Surf Limits (MSL) for each type of amphibious vehicle and landing craft utilized in amphibious operations. The JSM does not include MSLs for raiding craft. It was published, and then revised (to include LCAC considerations), prior to the advent of the MEU(SOC) raid program. Prior to that, the surf considerations for raiding type craft were not included because of the special nature of the personnel utilizing these craft, the limited amount of raiding craft utilization relative to other amphibious vehicles and landing craft, and because of the significant differences between raiding craft capabilities and all other amphibious vehicles and landing craft. The most significant differences are the raiding craft's sprint speed, maneuverability, weight, and the specially trained personnel that utilize them.

3. **Modified Surf Index (MSI)**. Chapter 11 of the JSM sets forth formulas for the computation of MSIs based upon forecasted (SURFCST) and observed (SUROB) surf conditions. It also sets forth the MSLs for landing craft and amphibious vehicles. Every one of the conditions listed in the MSI calculation sheet must be taken into account, regardless of type of craft, before attempting a surf passage. However, the MSI calculation tables are heavily weighted towards those factors (littoral current and breaker angle) that most adversely affect landing craft and amphibious vehicles. While these factors are important to raiding craft navigation, they are not as critical to raiding craft surf negotiation as they are to other types of craft and vehicles. The factors most important to surf negotiation by raiding craft are significant wave height, period, and breaker type (not heavily weighted in the MSI table). In lieu of JSM MSLs for raiding craft, commanders and planners have attempted to assign arbitrary MSLs for raiding craft, usually between two and four, depending on the unit involved. Commanders need some type of criteria to guide them in the GO/NO-GO decisions; however, for the reasons listed above, the use of MSIs and arbitrary MSLs can be very misleading. The examples below show the problems possible on both ends of the spectrum.

a. Example 1:

SUROB/SURFCST		MSI VALUE
Sig. Brkr. Ht.	=	5 feet 5.0
Period	=	14 sec. 0.0
Brkr. Type	=	50%Plg/50%Spl-2.5
Brkr. Angle	=	10 Deg. 2.0
Litt. Curr.	=	1 Knot 3.0
Other factors	=	Best Poss. 0.0
Modified Surf Index		7.5

b. Example 2

SUROB/SURFCST		MSI VALUE
Sig. Brkr. Ht.	=	5 feet 5.0
Period	=	8 Sec. 2.0
Brkr. Type	=	100% Spl -5.0
Other factors	=	Best Poss. 0.0
Modified Surf Index		2.0

These two examples show the use of the MSI to be very misleading for raiding craft operations. In the first example, and MSI of 7.5 would cause most commanders to not allow raiding craft surf operations. However, the long period between the waves would make this set of conditions safe for CRRCs. The coxswains could easily stay just behind the advancing breaker as they approach the beach, and would have time to wait for the wave to break, then sprint over it on the way out. Also, even though the breakers are approaching the beach at an angle, the coxswain could easily keep his craft perpendicular to the surf as he transits the surf zone, and then quickly turn to land perpendicular to the beach at the last moment. Upon landing, the boat team could quickly drag the craft out of the water, thus negating the problems long landing craft have with breaker angles and littoral current. If an engine stalled in these conditions, the boat team is trained to quickly break out paddles and man-power themselves in and out. Again, the long interval between waves would allow for their reaction time; and, since a boat team of eight men can paddle at approximately four knots, they would be able to overcome the littoral current.

Example 2 is even more significant. In this case the conditions produce and MSI of 2, which would most likely result in a commander approving surf operations. However, these conditions would be very hazardous for raiding craft. The short breaker interval, which is not significant for Navy landing craft, in combination with the high significant wave height would be treacherous for raiding craft. Coxswains trying to follow a wave in would find the next wave crashing down on them on the way in, and would not have time to recover from one wave before they met the next one on the way out. Additionally, if an engine stalled, they would not have time to break out paddles and gain control between the waves.

4. GO/NO-GO Criteria for MEU(SOC) Raid Force Surf Zone Operations. Based on the problems discussed above, the following criteria is established to guide commanders on the decision to cross surf zones.

a. CRRCs

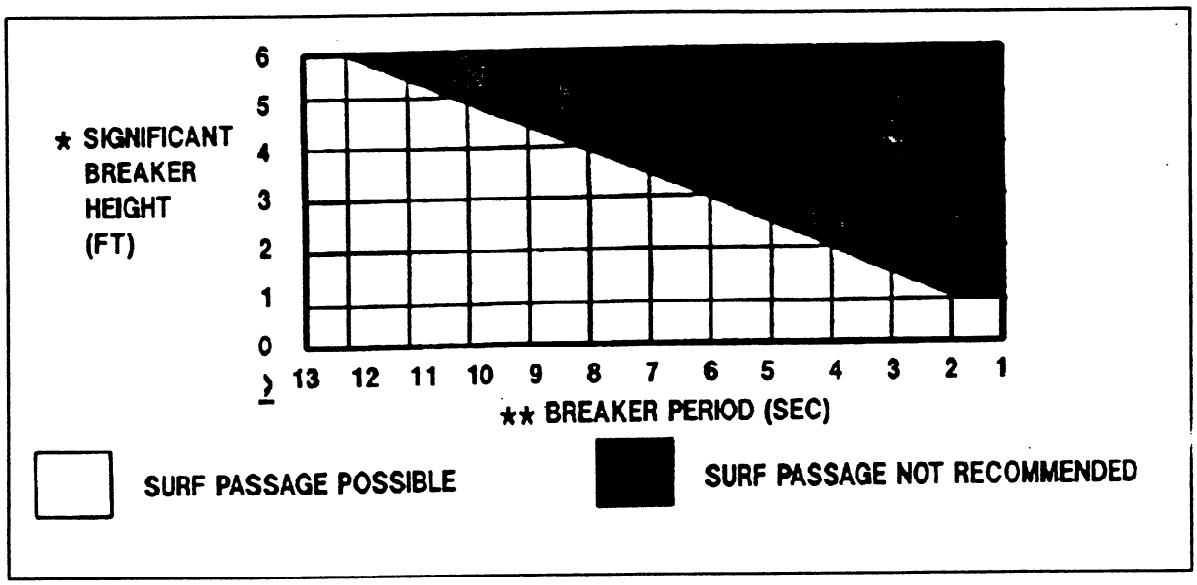
(1) Spilling Waves. (See Figure 1) The MEU(SOC) raid force recommended CRRC surf passage table should be used in lieu of MSI/MSL. Referring to the examples above, it is clear that this chart more correctly weighs those factors important to raiding craft. In Example 1, the use of this chart would result in a plot "off the chart" on the "GO" side. In Example 2, the use of this chart would result in a plot in the "NO-GO" area. It must be emphasized however, that all of the factors not on the chart must be considered and sensibly applied. For instance, a commander who finds conditions resulting in a "GO" plot on the chart might also have new crews, poor visibility, and high winds to deal with. In this case, he might opt for a "NO-GO" even though the chart would allow for a "GO". Conversely, he may have a plot just barely into the "NO-GO" area on the chart, but, because of proven crew and maintenance competence, good visibility, and safety apparatus on both sides of the surf zone, he may opt to allow the craft to proceed through the surf one or two boats at a time. This limiting of the number of craft in a surf zone at any given time should always be considered when conditions are near "NO-GO" to prevent the possibility of needing more rescue apparatus than is present.

(2) Plunging Waves. (See Figure 1) Same as above except more care must be exercised in considering all of the other factors that affect craft in a surf zone.

(3) Surging Waves. Surging waves are the most dangerous of all breakers. Surf passages are not possible in a surf zone made up of predominantly surging waves of over two feet significant wave height.

b. RRCs. (See paragraphs 302 and 310) Surf passages only possible when significant wave height is one foot or less, regardless of breaker type.

MEU(SOC) RAID FORCE RECOMMENDED CRRC SURF PASSAGE TABLE (FOR SPILLING AND PLUNGING WAVES ONLY)



* SIGNIFICANT BREAKER HEIGHT - The average wave height of the highest one-third of a given wave group measured to the nearest .5 feet.

** BREAKER PERIOD - Average length of time between breakers. Computed by dividing total time elapsed (in seconds) for 100 breakers.

REFERENCE: COMNAVSURFPAC/COMNAVSURFLANT INST 3840.1B (JOINT SURF MANUAL)

NOTE: This table is only a guide. Other factors requiring subjective evaluation by officers exercising command are: wind, weather, visibility, littoral current, and the state of training and maintenance within the raid force.

APPENDIX F

RIGGING AND LASHING

1. **General**. This Appendix is designed to guide MEU(SOC) small boat raid forces in the rigging and lashing of equipment aboard their craft. It is not dictatorial for two reasons: (1) the many variables present for each unique mission/situation prevent any one set of rules from working universally. What will work is the logical application of the theories, philosophies, and general procedures for rigging and lashing applied to a given situation. (2) Rigging and lashing procedures, especially as applied to research and development, are forever improving. Commanders should continue to seek out and improve on the methods shown here with the intent of making them either safer or more likely to ensure mission accomplishment.

2. **Types and Priorities of Waterproofing**

a. Types of Waterproofing. Equipment can be prepared in one of three ways: weatherproof, waterproof, and watertight. Separately, or in conjunction with any of these ways, equipment can be prepared to float by adding positively buoyant material; or, ballasted with dead weight to ensure that naturally buoyant gear will not float on the surface. For the majority of raid personnel, the minimum desired is waterproofed, floatable equipment; however, scout swimmers may want their equipment waterproofed and weighted/ballasted so that it will remain just under the surface of the water as they clandestinely swim ashore. All raid company personnel receive instruction on waterproofing during MEU(SOC) raid course.

(1) Weatherproof. Light preparation of equipment for dry or routine operation, protecting equipment from the elements, i.e., light rain/dust. Example: Placing a radio inside an ALICE pack.

(2) Waterproof. Medium preparation of equipment done when it evident the equipment will have prolonged exposure to water, rain, or snow. Example: Placing and sealing a radio inside a waterproof bag.

(3) Watertight. Maximum preparation of equipment when prolonged contact with water is expected such as locking out of a submarine. Example: Placing waterproofed equipment into waterproof containers.

b. Priorities of Waterproofing. Waterproofing equipment is expensive; both monetarily and in terms of time spent. Commanders should issue guidance on types and priorities of waterproofing as part of their Warning Order.

(1) Class I Equipment. Electronic, optical, and highly technical equipment, e.g., starlight scopes, night vision goggles.

(2) Class II Equipment. Maps, log books, charts, report forms, and all physical recording materials.

(3) Class III Equipment. Equipment that is less susceptible to the environment; i.e., weapons and ammunition.

(4) Class IV Equipment. Includes all convenience items such as clothing, boots, socks, t-shirts, undershorts, etc.

c. Waterproofing Materials

(1) Waterproof Bag. (Willy-peter bag) Large enough to carry most individual equipment inside the ALICE pack. Can also be used to waterproof externally carried equipment, e.g., sleeping bag. Must be checked for serviceability prior to each use by filling with water or by blowing up with air.

(2) Plastic Bags. Green colored bags in various sizes. They are trimmed to fit and sealed with waterproof tape.

(a) Machine Gun Bag. 7-12 feet in length, 20 inches wide. Size 4 bag. NSN 8465-00-185-0725

(b) Submachine Gun Bag. 4-6 feet in length, 20 inches wide. Size 3 bag. NSN 8465-00-185-0724

(c) Rifle Bag. 45 inches long, 15 inches wide. Size 2 bag. NSN 8465-00-185-0723

(d) Pistol Bag. 18 inches long, 8 inches wide. Size 1 bag. NSN 8465-00-185-0722

(e) Clear Plastic Bag. These bags come in various sizes. They are clear and secured by a zipper-type lock.

(3) Poncho. Field expedient method for weatherproofing and waterproofing. Can also be used to make poncho raft.

(4) Waterproof Tape. Two types: cloth and plastic.

(5) Duxseal. Putty-like compound used to seal containers, e.g., night vision goggle case.

(6) LSA/Break-free or Grease. Used as a second barrier to protect your equipment from rust and deterioration.

(7) Lamination Plastic. Used to protect paper-type equipment, i.e., maps, charts, report forms, etc.

(8) Miscellaneous Items. Used to aid in waterproofing equipment.

(a) Scissors

(b) Sharp blade or knife

(c) Camouflage paint

(d) Rope or string

(e) Isopor (sleeping) mat

d. Waterproofing Procedures

(1) Inspect equipment for serviceability and operation.

(2) Test equipment to ensure operational capability.

(3) Replace any worn or defective equipment or parts.

(4) Clean all equipment and ensure equipment is ready for use, i.e., radio frequencies preset, batteries inserted, etc.

(5) Place waterproofing tape over all sharp edges on equipment.

(6) Prepare the cover or container for the item(s) being waterproofed. Shape the waterproofing material over the item(s).

(7) To allow access to the equipment, place a zipper in the waterproof container. First, place a two-inch wide strip of tape approximately 1/3 of the distance from the sealed end. Cut a slit in the center of the tape, with no less than one-inch of tape uncut on both sides of the slit. Place another strip of 1-1/2 inch tape uncut on both sides of the slit. Place another strip of 1-1/2 inch tape (cut or tear) directly over and centered on the slit. To ensure easy removal of the tape and the opening of the slit, turn one end of the tape back on itself having two adhesive surfaces face-to-face to form a tab. The slit will allow easy access to the equipment in the waterproof container. Articles can be removed or replaced without destroying the container. Opening of the zipper can also allow air to circulate and moisture to dissipate.

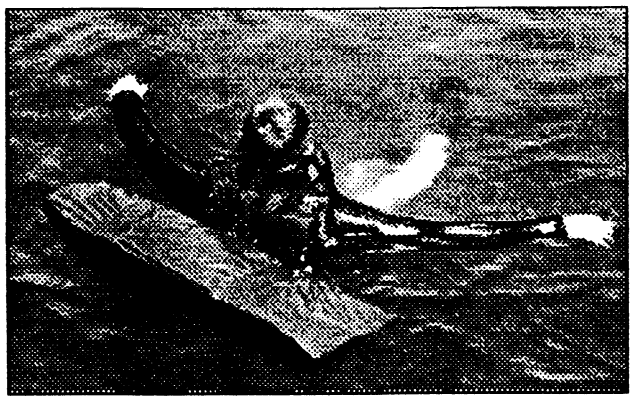
(8) Apply Duxseal to container lids, close, and apply waterproof tape over the seal. Ensure items inside containers are waterproofed in bags.

(9) Paper material/maps will be waterproofed by placing clear laminating plastic on both sides of the material, then sealing the ends with waterproofing tape.

3. **Rifle Flotation Device (RFD)**

a. The RFD is assembled, and reassembled when necessary, by the raid company personnel using locally available material and the instructions given in the MIJ(SOC) raid course. It can be configured to accommodate the M-16A2, M-60A3, M-203, and the M-249 SAW. Weapons are packed in it muzzle first with the sights toward the folded edge. The weapon is sealed in the device at the butt using waterproof tape. The weapon is also "dummy corded" to the RFD. This prevent a Marine from losing his weapon in the ocean

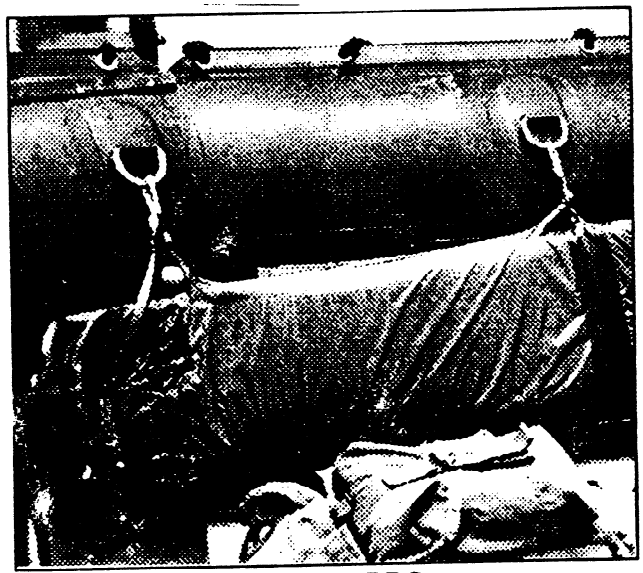
matting, it provides a more comfortable ride than without it. It also reduces the chances of Marines getting injured by rifle barrels and butts. If a boat flips, the RFD presents a smooth and slick surface, remaining close to the inflation tube of the CRRC. This is much better than a dummy corded weapon, which creates and entanglement hazard when a boat flips. If needed, the weapon can be drawn from the stowed RFD and fired from the boat while remaining dummy corded to the RFD itself. Outside the surf zone, the scout swimmers, and possible the number one and number two men of the first wave will detach the RFD from the CRRC and attach it to their load bearing equipment, scabbard style. This allows them to "draw" their weapons quickly. Should a Marine need to assist another Marine in the water, he can use his RFD much like a Peterson Rescue Tube and throw it to the Marine needing help. It will still be tethered to him by the dummy cord. Once out of the scabbard, the weapon can be fired by supporting it on the RFD and it can be dropped totally and still be recovered because of the dummy cord attachment. In a life or death situation, a Marine can ditch his load bearing equipment, leaving him with just his life preserver. His weapon and his gear will be floated by the RFD, allowing it to be recovered after the emergency.



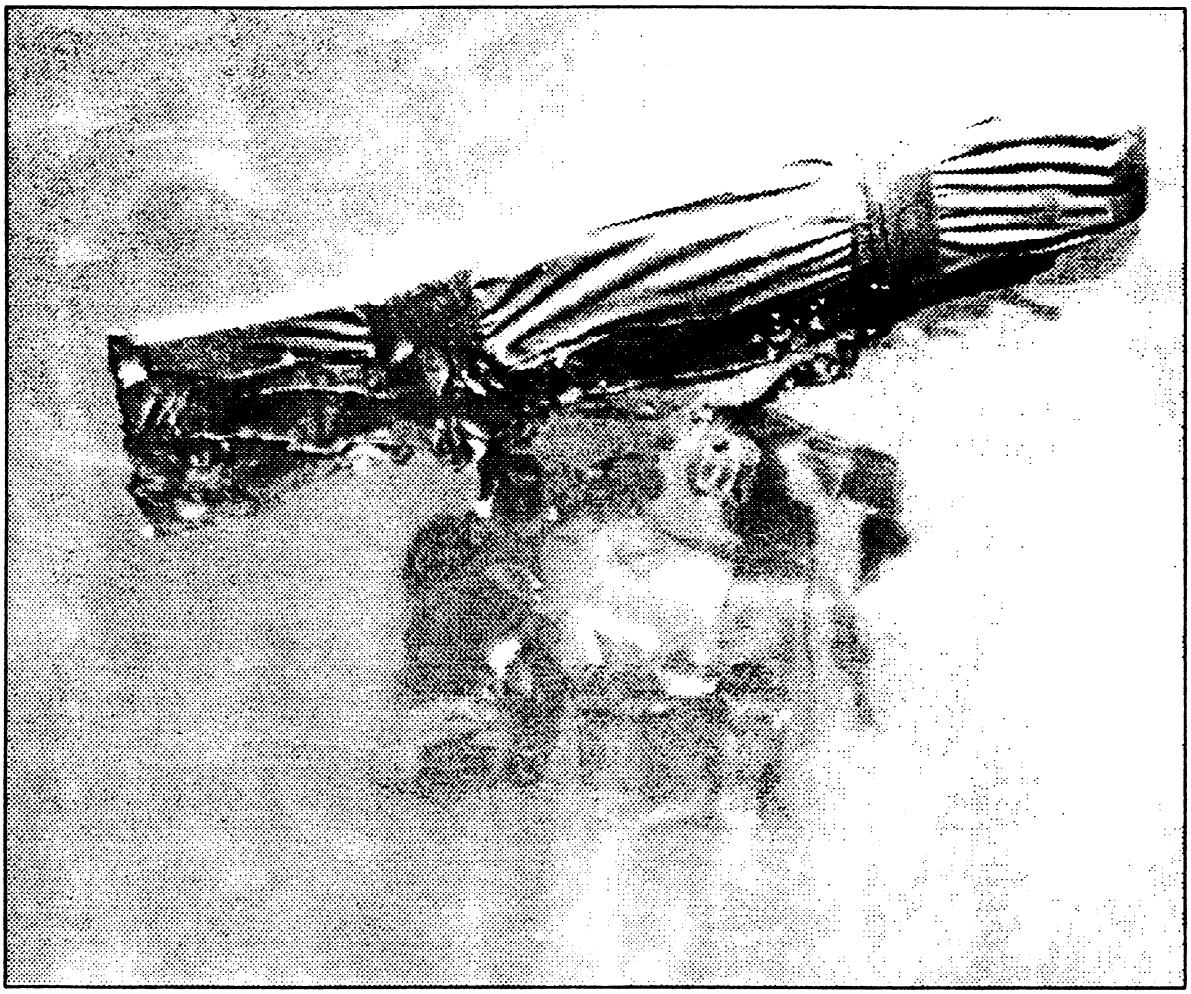
RFD ATTACHED TO MARINE'S LOAD BEARING EQUIPMENT. NOTE ADDED BOUYANCY PROVIDED.

Designed by the staff at LFTCPAC to:
- Protect the weapon from the elements
- Protect the Marine from injury
- Protect the boat from damage
- Allow for quick access to the weapon
- Keep weapon afloat even if separated from the Marine (if he ditches his gear)
- Provide additional Floatation for the Marine and his equipment

MARINES RIDING CRRC WITH RFD STOWED (SNAPPED) INTO CRRC



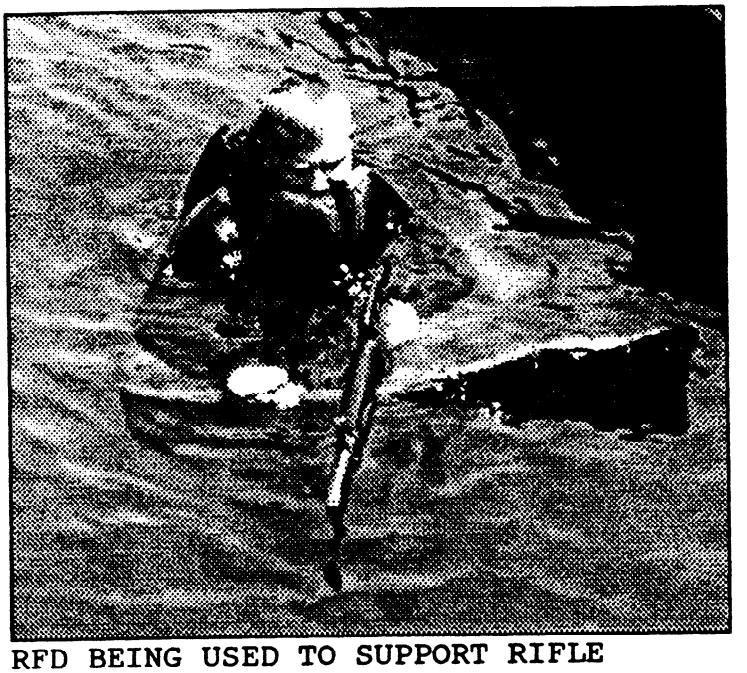
RFD SNAPPED INTO CRRC



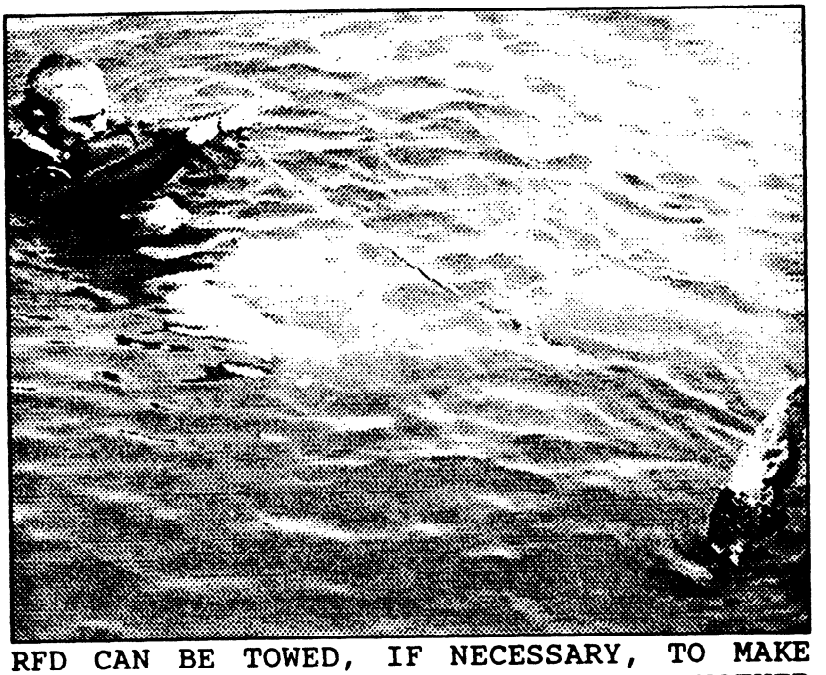
RFD THAT HAS BEEN "DITCHED". NOTE THAT IT STILL SUPPORTS THE LOAD BEARING EQUIPMENT AND THE RIFLE. (40 LBS OF WEIGHT IN BUTT PACK SHOWN)

RFD ATTACHED SCABBARD STYLE

MARINE DRAWING WEAPON FROM RFD



RFD BEING USED TO SUPPORT RIFLE



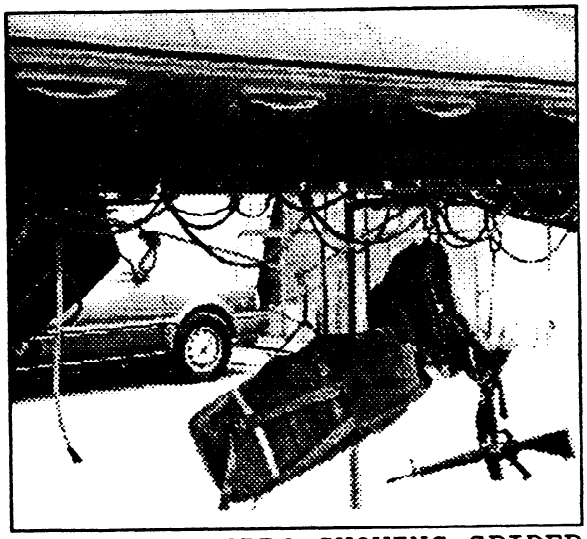
RFD CAN BE TOWED, IF NECESSARY, TO MAKE SWIMMING EASIER OR TO RESCUE ANOTHER SWIMMER

WEAPON CAN BE DROPPED AND NOT LOST

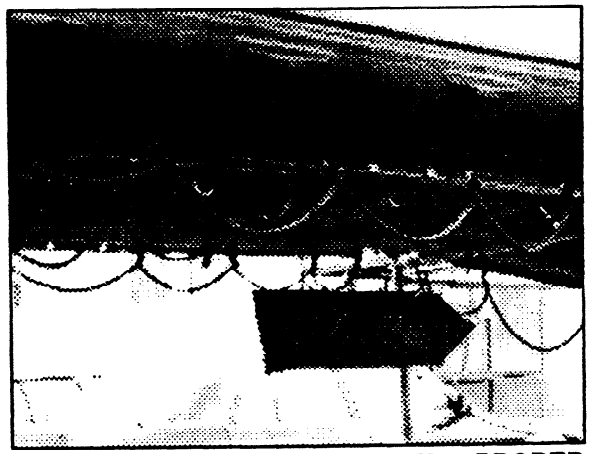
4. Loading and Lashing the CRRC (Zodiac F-470)

a. Load Distribution. In general, equipment is loaded in reverse order of when it will be needed. Mission sensitive equipment is normally placed in the center of the boat. When rough seas are expected, load from stern to bow on the way to the beach and from bow to stern on the way back to the ship.

b. Lashing of Equipment. The type and amount of lashing used is dependent upon the number of weapons, ammunition and equipment required for the mission. In general, Marines travel much lighter during small boat raid operations than during more conventional amphibious assaults. The speed with which raids are conducted, their short duration, and the limited logistics capability of the raid force all dictate that the unit travel with only the minimum essential gear. Equally important to note, however, is that there isn't sufficient room to carry a great deal of equipment aboard the CRRC. The gear carried must be tightly secured and kept low and out of the way to prevent possible entanglements. A potentially dangerous "spider web effect" can occur when a boat overturns if equipment is improperly stowed.

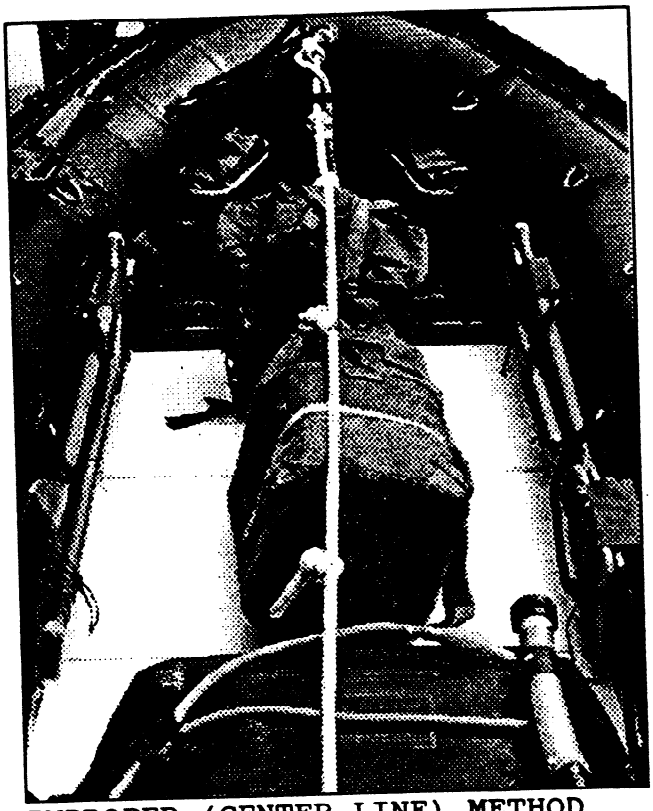


OVERTURNED CRRC SHOWING SPIDER WEB EFFECT CAUSED BY IMPROPER (CENTER LINE METHOD) RIGGING. ONLY ONE SET OF GEAR SHOWN FOR CLARITY.



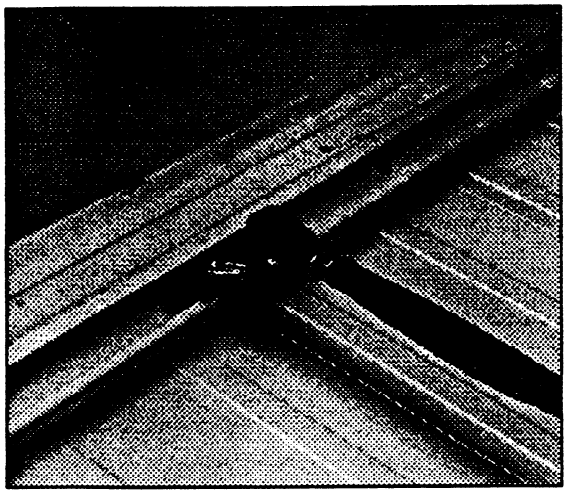
OVERTURNED CRRC WITH PROPER RIGGING. NOTE ALL GEAR REMAINS CLOSE TO DECKING. NOTE TOO THAT RFD, BEING BOUYANT, WOULD NOT DANGLE AS SHOWN, BUT WOULD RISE UP OUT OF THE WAY.

c. Centerline Method. The centerline method of lashing was a contributing factor leading to the death of a Marine in Australia. It does not provide a secure means for the stowage of gear and will not be used.

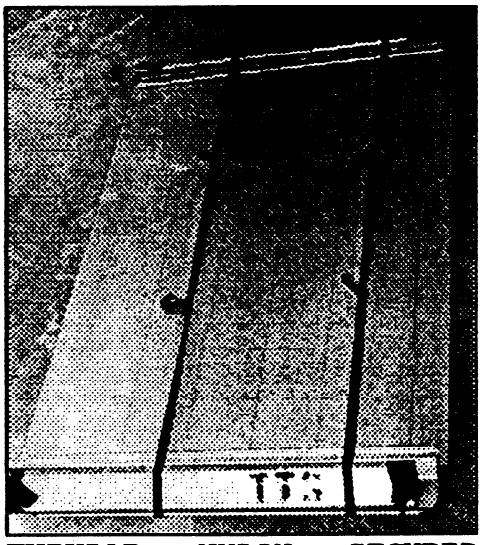


IMPROPER (CENTER LINE) METHOD

d. Slide Runners/Tubular Nylon Method. There are two acceptable ways for lashing gear into an F-470 CRRC. One uses parts manufactured by Zodiac for just this purpose called Slide Runners (Zodiac part # 1201). THe other uses 1/2-inch tubular nylon secured around the deck plates prior to installing them into the F-470. The slide runners are expensive, but allow for adjustments since they slide along the deck plates and then lock into the desired position. The slide runner has been stress tested and found capable of holding 500-600 pounds each. Raid companies receive instruction on proper knots and specifics on stowing all of their equipment during the MEU(SOC) raid course.



SLIDE RUNNER WITH TUBULAR NYLON ATTACHED - KNOT WRAPPED IN TAPE



TUBULAR NYLON SECURED AROUND DECK PLATE PRIOR TO INSTALLING

A PROPERLY RIGGED CRRC (F-470). NOTE: ONLY ONE SET OF EQUIPMENT SHOWN FOR CLARITY.

5. **Loading and Lashing the RRC**. The RRC is easier to load and lash than the CRRC. This is because it has tie-down points recessed in its deck and because it is not taken through hazardous surf. The principles for loading the CRRC are still followed however. Equipment is waterproofed, bagged, and/or padded and lashed tightly to the deck tie-downs/clevices just as equipment is lashed to the tubular nylon in a CRRC. Gear is loaded in the reverse order of need with mission essential equipment near the center of the boat. RFDs, if used, are clipped to the interior grab rails and the radios needed for enroute communications are lashed to the console. The RRC's load is distributed to account for sea conditions in the same manner as the CRRC; however, the coxswain is able to trim the engines on an RRC, thus making it easier to get the boat on plane.